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"Destroyer of Engines"

IT was the Arabs themselves who gave to the late Col. T. E. Lawrence the name by which he might most fittingly be remembered. In this country we have known him as "Lawrence of Arabia"—a title giving no clue to the nature of his work—and as "Aircraftsman Shaw"—his own invention to submerge his identity—but the Arabs called him "Destroyer of Engines." His wrecking operations during the war along the main line of the Hedjaz Railway between Deraa and Medina were distinguished by the thoroughness of an engineer and the strategic insight of a great general. Of him it was said by Mr. Ian R. Frazer, in a paper read to the Scottish Section of the Permanent Way Institution on January 17, 1930, "just as our railway troops created records in track laying, so did Colonel Lawrence and his team of railway wreckers become the world's best track destroyers." It is ironical that a man with the diverse talents of Col. Lawrence should be remembered best for a work of destruction, but in estimating his courage, the moral strength that enabled him to subordinate the aspirations of a creative mind to the urgency of the moment will be no less valued than the physical daring of his exploits against the Turkish troop trains.

New Ways for British Holidays

Modern conditions call for modern holidays. No longer is the average Englishman content to hie away with his family to spend his annual holiday lazily recuperating from the effects of a year's toil on the beach at Yarmouth, Cleethorpes, or elsewhere. Today he seeks to give vent to his ecstasy during his brief spell of freedom in a rather more hectic fashion. "Do as much, and see as much, as far away from home as possible" seems to be the order of 1935. Even the word "possible" would probably be omitted if the depth of his pocket and the limits to his physical endurance could be ignored. To help the Englishman in the pursuit of his modern holiday, therefore, the L.N.E.R. has in recent years issued a series of booklets entitled, "New Ways for British Holidays." Each of these covers a different area in England, the Yorkshire Dales or East Anglia, for example, and gives in a concise form all the information required for planning a modern holiday in that area. In addition to descriptive matter concerning the various resorts, a most useful map showing rail and railway-associated road facilities is given; numbers against both railway lines and roads indicated on the maps give a ready reference to the appropriate services. This year the time and fare tables are printed separately from the main booklet and inserted in a pocket inside the front cover.

* * * *

The Week's Traffics

The large decreases in passenger train earnings of the four group companies for the past week are mainly due to the fact that the returns compare with a week in 1934 which included the receipts for the Whitsun exodus. Monday in all cases and Sunday in that of the L.N.E.R. are excepted. Bearing the Whitsuntide comparisons in mind the total passenger train earnings of the L.M.S.R. for the 20 weeks of the present year amount to £8,153,000, an increase of £93,000, and the corresponding figure for the L.N.E.R. is £5,349,000, an increase of £115,000. The Southern passenger train takings to date are £5,107,000, showing an advance of £101,000, but the Great Western passenger total of £3,399,000 is £5,000 below that for 1934. Aggregate merchandise and coal receipts have dropped in each instance.

	20th Week				Year to date.	
	Pass., &c.	Goods, &c.	Coal, &c.	Total.	Inc. or dec.	
	£	£	£	£	£	%
L.M.S.R. ..	− 143,000	+ 20,000	+ 1,000	− 122,000	− 48,000	− 0·22
L.N.E.R. ..	− 62,000	+ 20,000	− 2,000	− 44,000	− 234,000	− 1·43
G.W.R. ..	− 54,000	+ 7,000	+ 7,000	− 40,000	− 81,000	− 0·89
S.R. ..	− 75,000	− 500	+ 1,500	− 74,000	− 33,000	− 0·47

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Baths and Trains

In a recent law case, counsel said that accidents through slipping in baths are so common in the United States that it is a thousand times more risky to take a bath than to step into a train. It has not occurred to us to keep statistics of the relative dangers of entering a bath and a train in Great Britain, so we are not in a position to compare the risks in the respective countries; in our experience taking a bath is a pleasant affair, devoid of any excitement except that of chasing the elusive soap, and we enter a train with a mind calmed by the perfect reliance we place in the efficiency of our railway systems in all their branches. But we notice that Sir Frederick N. Henderson recently brought an action against the L.M.S.R. for £5,000 damages in respect of injuries sustained while attempting to board a train at Troon. On the basis of that figure it would appear that the actuarial risk of bathing in America is equal to £5,000,000—a truly staggering sum for just slipping in a bath. Perhaps makers of

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sanitary wares will equalise the risk of railway travel and ablutions by bringing out a bath with a non-slip bottom, thus taking away the unimagined dangers from the matutinal tub.

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Overseas Railway Traffics

On the whole the increases in currency receipts of Argentine railways have been on a rather lower scale for the past fortnight than for the two weeks immediately preceding it. In the aggregate for the 46 weeks of the current year the Buenos Ayres and Pacific has an increase of 3,533,000 pesos or 6·03 per cent.; on the Buenos Ayres Great Southern the advance is 6,664,000 pesos or 6·24 per cent.; the Central Argentine has an increase of 6,721,150 pesos or 7·59 per cent.; and on the Entre Rios, which now has an increase of £1,603 in sterling, the advance has been 1,440,800 pesos or 17·75 per cent. For the 19th week of the present year the San Paulo (Brazilian) Railway has begun to calculate its sterling receipts on a new system, based on the free market rate of exchange, and following this method the aggregate receipts for the 19 weeks are £54,816 lower in sterling, although the earnings in currency are higher.

	No. of Week	Weekly Traffics £	Inc. or Decrease £	Aggregate Traffic £	Inc. or Decrease £
Buenos Ayres & Pacific	46th	100,354	+ 11 656	3,639,581	— 304,978
Buenos Ayres Great Southern	46th	133,884	— 826	6,647,414	— 582,026
Buenos Ayres Western	46th	56,080	+ 10,067	2,089,280	— 353,418
Central Argentine	46th	144,646	+ 8,665	5,575,937	— 462,401
Canadian Pacific	19th	452,600	— 58,200	8,168,200	— 141,800
Bombay, Baroda & Central India	5th	253,050	+ 2,175	957,750	+ 4,800

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Scenic Excursions in Jubilee Week

Popular as the old folks' tea parties and similar celebrations organised at the Silver Jubilee undoubtedly were, the most permanent memories of the event probably belong to those who were treated to some form of excursion. Two such outings for elderly people were arranged during Jubilee Week by the Borough of Redcar and the Urban District of Billingham, and in co-operation with the L.N.E.R. intineraries were drawn up which gave an afternoon and evening of travel through widely varied coastal and inland scenery. The picturesqueness of the routes chosen was seen at its best by the use of trains of the special L.N.E.R. tourist stock, with their comfortable seating and unobstructed outlook. Tea was served during the journey along the coast between Whitby and Redcar in each case. The trains from Redcar were routed outwards via Saltburn, Nunthorpe and Battersby to Whitby, where time was allowed to inspect the town. The coast line was followed throughout on the return journey. Billingham excursionists also travelled inland to Battersby, whence they followed the route of the other trains to Whitby and Redcar.

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Hungarian Railways in 1933-34

The recently-issued report of the Royal Hungarian State Railways for the fiscal year ended June 30, 1934, shows that the operating revenues of 209,097,420 pengös exceeded the administrative and executive expenses by 47,938,530 pengös. In the final result, however, there was a deficit of 54,707,653 pengös, due to interest and amortisation charges of 25,846,438 pengös and miscellaneous expenses of 76,799,745 pengös. To the total traffic receipts of 196,074,982 pengös passengers contributed 64,470,485 pengös, luggage and express goods 850,164 pengös, and freight traffic 130,754,333 pengös, and there were miscellaneous receipts of 13,022,438 pengös. In the executive service expenses of 147,193,477 pengös the largest items were 44,575,388 pengös for transportation, 40,760,560 pengös for traction, 27,075,281 pengös for workshop service, and 24,272,254 pengös for maintenance of road and structures. At the present rate of exchange £1 = 16¾ pengös. The average length of line in operation during the year was 7820 km., of which 7,708 km. were used for passenger and freight service, and the remainder for freight service only. Passengers numbered 58,256,381, and revenue freight totalled 15,184,337 tons, with ton-kilometres of 2,061,478,250. The tonnage of goods traffic (apart from luggage and express goods) is divided into 368,123 fast freight, 369,576 L.C.L. common freight, and 14,446,638 carload freight.

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Time Recovery Extraordinary

A notable locomotive performance figured in the March issue of *Le P.O. Illustré*, the staff organ of the Paris-Orleans-Midi Railway. This was a run on the northbound Sud Express, which, because of late running of the Spanish connecting train, left Hendaye 80 min. late. Notwithstanding 10 min. lost by permanent way and other delays *en route*, the whole of the arrears, with the exception of 3 min., had been regained on arrival at Paris (Austerlitz)—an actual gain of 77 min., and a net gain of 87 min. on what is a very fast schedule. The load of the train is, however, relatively light, being 255 tons from La Négresse (Biarritz) to Paris. From Hendaye to Bordeaux the train, electrically hauled, covered the 144½ miles in 2 hr. 48 min., instead of 3 hr. 9 min., including the usual 15 min. at five intermediate stops. From Bordeaux to Paris (Austerlitz) exactly one hour was cut from the schedule, bringing the time down to 5 hr. 16 min. for the 362 miles, including four stops totalling 8 min. The 70·0 miles from Angoulême to Poitiers were covered in 60 min. start-to-stop, behind Pacific No. 231.728, which worked the train from Bordeaux to St. Pierre-des-Corps; and electric locomotive No. E.2D2.512, which ran the express on from there to Paris, covered the 73·8 miles from Les Aubrais to Austerlitz in 62 min. (booked 82 min.), at an average of 71·4 m.p.h.

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The Ashford Collision

Three thoughts are prompted by Colonel Trench's report on the collision of September 1 last at Ashford, which is summarised on page 1042 herein. The first is that it was a pity that the signalman, "who was aware of the arrangement contemplated" and who presumably knew that, owing to the curvature of the line, the train might be standing out of his sight, did not, whilst the movement was before him, at once put a collar on the lever of the home signal. The second thought is that as he had constantly to use the releasing key, and thereby to free the lock-and-block provided to safeguard trains standing at his box, he presumably did so on this occasion from force of habit. As Colonel Trench remarks, such cancellation is unfortunately a necessity at times, but its use is only justified in certain circumstances, and signalmen should assure themselves that such circumstances exist. In this respect it is a matter of satisfaction that not since the collision of November 16, 1918—over sixteen years ago—at Elderslie, Glasgow & South Western Railway, has a collision been reported upon that was due to the irregular use of the releasing key. The third point is that the Southern Railway—and, we believe, the L.M.S.R.—does not allow the exemption to rule 55, intimated by the diamond-shaped board on a signal, to apply to shunting movements. That, we presume, is due to the fact that, contrary to the conditions usually prevailing when a running train is detained at such a signal, a train that is shunting is not "in block" and so is not indicated on the block instruments.

Inadequate Revenue on the American Railways

Dr. Julius H. Parmelee, Director, Bureau of Economics of the Association of American Railroads, has published a report on operations during the past year which is rounded off with the forthright remark that "the railways urgently need an increase in net income in 1935, by whatever means such an improvement may be secured." That is his reflection upon a survey showing increases in freight and passenger revenue, but a smaller net operating income due to higher costs of working. To counteract this factor the railways propose increases in certain freight charges, but the programme for maintaining what was the first improvement in passenger revenue recorded since 1923, amounting to 5·1 per cent., suggests the provision of yet more comfortable and faster trains, coupled with extended inducements to travel, in the shape of lower fares. It will be noticed that Dr. Parmelee does not claim that the railways must find their own means of increasing revenue, and he hints that assistance may come from without in the shape of reviving trade. But here he seems to beg the question, for is he not proposing that every industry should wait, like Mr. Micawber, for something to turn up in the shape of a revival on the part of its brethren, stricken by the same disease of a potential output exceeding purchasing power?

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Welded Rails in Victoria

The practice of welding rails end to end so as to reduce the number of rail joints is now well established in Victoria. In our issue of June 23, 1933, we gave an illustrated description of the reconditioning of the track, including the welding of joints to give 225-ft. rail lengths, on the electrified suburban lines around Melbourne, where, since 1931, 36 track miles have been so treated. Fourteen miles of the Deniliquin-Moama line are now to be relayed with long welded rails. Serviceable 75 lb. rails taken out of the Ballarat-Maryborough-Donald line will be used, and the welding will be carried out at the Spotswood shops. They will be welded into 103-ft. 4-in. lengths and transported to the site on flat wagons. No chains are used to secure the rails to the trucks, and when the vehicles enter a curve the rails follow the alignment of the track quite easily. In the course of overhauling the permanent way through Elphinstone tunnel on the Bendigo line, the tracks are to be relayed with 90-lb. rails welded throughout for a total length of nearly 1,700 ft. These will be the longest rails yet laid in Victoria.

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Limitation of Light Rail Overcome

On the Nigerian Railways, as mentioned in the report of Mr. G. V. O. Bulkeley, C.B.E., the General Manager, covering the year ending March 31, 1934, the question of the most suitable and economical method of operating traffic over a line handicapped by an intermediate section laid with only 45 lb. rails has been under lengthy consideration. The solution, it was considered, lay in either relaying and bridge strengthening, or the utilisation of eight or ten-coupled three-cylinder engines of orthodox type or articulated locomotives. After thorough examination, and bearing in mind the satisfactory performance of the Beyer-Garratt locomotives which have been in service on the Nigerian Railway for the past five years, it has now been decided that new motive power in the form of Beyer-Garratt locomotives is the most economical solution of the problem. Accordingly, as recorded in our Contracts and Tenders section this week, an order for four 4-6-2 + 2-6-4 locomotives has been placed. The opportunity has been taken in the new engines to test the advantages of higher boiler pressures, and all four boilers have been designed for 225-lb. pressure, though two will be delivered arranged for 200-lb. working pressure and the engine cylinders will be proportioned to suit. The locomotives will be built to a modern specification and are of particular interest as it has been found possible to ensure a very flexible wheelbase to meet severe curvature conditions and to provide, within the limitations of a six-coupled type, tractive force of approximately 33,500 lb. at 85 per cent. boiler pressure, and a maximum axle loading restricted to 9¾ tons.

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The Steam Locomotive and Speed

Designed to run smoothly and easily at 100 or more m.p.h. with trains of moderate weight, a remarkable two-cylinder oil-burning 4-4-2 express engine has been produced by the American Locomotive Company for the especial purpose of hauling the Hiawatha, the new high-speed train which the Chicago, Milwaukee, St. Paul & Pacific Railway put into service on May 10, between Chicago and the Twin Cities. As we said in our preliminary announcement on February 8, both locomotive and train are streamlined and mounted on roller bearings, and are scheduled to travel the distance of 410 miles in 6½ hours including five intermediate stops, an average running speed of 63 m.p.h. It will be seen from our illustrated description on page 1037 that the engine incorporates a pair of single-expansion cylinders of moderate proportions outside the frames, large-sized coupled wheels, and a boiler having ample heating and superheating surfaces together with an abundant grate area and a high steam pressure. Thus, the cylinders, though relatively small, will always have a plentiful supply of steam at a high pressure and, although there are only two pairs of coupled wheels, these, between them, carry approximately half of the total weight of the locomotive in working order and as a consequence there will be little or no fear of slipping.

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Connecting Rods at High Speed

A minor but not uninteresting problem raised by superspeed runs such as that between King's Cross and Newcastle on the L.N.E.R. on March 5 is the stresses induced in the locomotive connecting and coupling rods. At really high speeds the stresses due to the steam pressure are small but those due to the inertia are very great. In designing rods a common practice has been to take the wheel-diameter speed as a base for calculating the inertia and combined vertical and inertia stresses, but with velocities of 100 m.p.h. or more the factor of safety resulting from this method may be encroached upon appreciably. Fortunately, the alloy steels in general use for modern rods have such high yield points that no trouble would be occasioned in designing a rod to suit everyday speeds of two miles a minute. For instance, the connecting rods of the Gresley Pacifics on the L.N.E.R. are of nickel-chrome steel with a minimum yield point of 40 tons per sq. in. At 108 m.p.h. (the record) the inertia stress in the outside rods of these engines is just over 14,000 lb. per sq. in. and the steam stress about 3,300 lb. (assuming 25 per cent. of the stress with full boiler pressure, and using the Merriman formula for columns under compression), giving a total of approximately 17,500 lb. per sq. in. This is well within the capacity of the steel used, although it is probable that a speed of 100 m.p.h. was not contemplated when the rod was being designed.

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Kenya & Uganda Railways and Harbours

A SATISFACTORY financial position is revealed by the figures in the report for the year 1934 relating to the combined, railway, harbour, and steamship services in Kenya and Uganda, which has recently reached us from Brigadier-General Sir G. D. Rhodes, the General Manager. A small estimated surplus for the combined services of £2,480 has been converted to an actual surplus of £344,654. As a result of this surplus, it has been found possible to liquidate completely the deficit account (representing contributions to the renewal fund which it had not been possible to meet in full) and to re-open the General Reserve Account by a small contribution of £26,708. By the closest possible attention to expenditure and operating efficiency, and by the elimination of wasteful and uneconomic services and movements, the costs necessary to earn a certain revenue have been much decreased and as a result, surpluses have been obtained in the last two years.

Combined earnings of the railways and harbours for the year ended December 31, 1934, amounted to £2,560,040, an increase of £133,856 or 5·52 per cent. on 1933 and of £439,025 or 20·70 per cent. on 1932. The combined ordinary working expenditure of £1,126,443, exclusive of contributions to renewals funds, shows an increase of £5,298 or 0·47 per cent. as compared with 1933, and a decrease of £42,942 or 3·67 per cent. as compared with 1932. The operating ratio of 44 per cent. for the combined services is the best yet recorded, and compares with 46·21 per cent. in 1933 and 55·13 per cent. in 1932. There is a gross surplus of £1,433,597 over ordinary working expenditure, and the £1,173,913 balance of net earnings over total expenditure on revenue account, gives a return of 5·24 per cent. on the total capital expenditure of £22,422,119, and of 8·40 per cent. on the interest-bearing proportion (£13,983,009) of this total, both being returns which other administrations might well envy. The net earnings balance covers interest and sinking fund charges of £829,259, leaving a surplus of £344,654 as mentioned above.

At December 31, 1934, the total railway route mileage worked was 1,625 miles on the metre gauge, including the 91-mile branch of the Magadi Soda Company. This length is the same as at the end of 1933. Comparative results of working the railway services (inclusive of lake steamers and motor transport services, but exclusive of harbour services) are shown in the accompanying table:—

	1934	1933	1 932
Passengers	484,138	512,999	558,492
Tons	756,832	771,714	726,154
Train-miles	2,435,176	2,587,739	2,454,237
Public freight ton-miles	281,448,745	308,338,673	256,180,707
Operating ratio, per cent.	44·64	47·41	56·79
Public ton-mile receipts	13·918 cents	11·813 cents	12·12 cents
Average haul, miles	373	387	341
	£	£	£
Passenger receipts	163,037	160,786	170,459
Goods receipts	1,961,105	1,821,927	1,564,967
Gross earnings	2,227,285	2,088,162	1,838,661
Working expenditure	994,287	990,054	1,044,161
To renewal funds	336,047	335,102	324,522
Miscellaneous receipts (net)	103,301	115,534	47,894
Net revenue	1,000,252	878,540	517,872
Loan charges	614,003	615,722	632,453
Surplus (+) or deficit (—)	+ 386,249	+ 262,818	— 114,581

Passenger receipts increased by 1·40 per cent. in spite of the fall in passenger journeys. The decrease in public tonnage results from the decreased movements of maize and cotton seed. The extensive review of rates which has been in hand during the past three years, partly for the purpose of obtaining additional revenue where justified, and partly to further the policy of eliminating and discouraging extravagant and uneconomic services, was completed during the year. In this connection, the statistics which are now available with the aid of Hollerith machines have proved invaluable. All the changes introduced from time to time in recent years as a result of this examination, have proved sound and beneficial. Following the practice introduced in 1929 an index of efficiency has been compiled covering the years 1926 to 1934 inclusive, the year 1926 being taken as the datum year. The final index figure has shown a steady advance each year to that of 143·98 in 1934.

The revised experimental district organisation of the engineering department operated throughout the year and has now been adopted permanently. In addition to securing certain financial economies, the new organisation has resulted in increased efficiency throughout. The track is now in a better condition than at any time previously, and the superior supervision now concentrated on the line under the new organisation is mainly responsible for the present satisfactory position. The caboose system of engine working again proved its value during the year, bringing about reduced running costs, reduced maintenance costs and longer periods between general overhauls. By this system, it may be recalled, the same locomotive can be used for long continuous runs, spare crews being carried in the caboose.

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Effect of Railway Rating Decisions

A RECENT article on the effect of the railway rating decisions has been contributed to *The Financial News*, which should make the position clear to the ordinary reader. In spite of the passing of the Railways (Valuation for Rating) Act, 1930, which has revolutionised the system of rating in England and Wales by substituting one valuation of each railway undertaking as a whole for the previous method of assessing the value in each separate parish, the old principle dating from the Parochial Assessments Act of 1836 still prevails that the valuation of a railway for rating purposes is based on the rent which a hypothetical tenant would be ready to pay for the undertaking. Before the passing of the Act of 1930, a body of rating practice and custom grew up at the various Quarter Sessions particularly with regard to deductions and allowances to be made in respect of the capital of the tenant, in order to arrive at the assessment. The Act of 1930, however, declares any such previous rating custom or practice to be no longer binding. Nevertheless, as Mr. Justice MacKinnon has pointed out (see THE RAILWAY GAZETTE of March 29 last, page 620), from a comparison of section 4 (1) of the Act of 1930, which lays down the provisions to be followed in preparing the railway valuation roll, with the Rating and Valuation Act, 1925, Section 22, it is clear that the old principle of the Parochial Assessments Act, 1836, still applies, and that the rent which a hypothetical tenant might reasonably be expected to pay is the net annual value. The principle of estimating the annual value, according to Section 4 (i) of the 1930 Act, involves the ascertainment of three points; (1) the estimation of the capital value of the plant and implements required by the hypothetical tenant to work the undertaking; (2) the fixing of a percentage to be allowed to the tenant as a reasonable remuneration for the use of his capital; (3) the estimation of the net receipts from the working of the undertaking. The difference between this percentage and the net receipts is the net annual value. Though the Act of 1930 does not expressly recognise the former "profits basis," it may reasonably be inferred that it is still to be taken into consideration from the requirement in the Act that the estimated rent

should represent a fair and just division of net receipts between landlord and tenant.

Problems of an economic character, however, arise in the course of the detailed application of the above principles, particularly in regard to rolling stock and its replacement value. In the Southern Railway appeal case the Railway and Canal Commission held that the value of the locomotives and rolling stock should be entered as an item in the tenant's capital account at the replacement cost, but that two items should be deducted for depreciation, namely, (1) an average figure for the "log of reconditioning," and (2) a deduction varying with the age of the type for its obsolescence. Apparently no such deduction for obsolescence had been made under previous rating practice. The company also claimed to add to the cost of goods manufactured in its own workshops a percentage to represent manufacturers' profits, and a further addition as representing a saving of cost owing to mass production. The Court held, however, that only the actual cost should be allowed. Lastly, the Court fixed the percentage to be allowed on the tenant's capital at 15 per cent. in the particular circumstances of the case.

The Railway and Canal Commission in reducing the Valuation of the Southern Railway undertaking to £1,077,131, did not profess to determine more than the broad principles of valuation, and the subsequent adoption of these broad principles by the Railway Assessment Authority in the case of the London and North Eastern Railway, resulted in the valuation of that company's undertaking in England and Wales being entered as nil. Appeals to the House of Lords have been entered in respect of the valuations of both the Southern and the L.N.E. Railways, but supposing they stand a difficult situation will arise as to the Freight Rebates Fund constituted under Schedule XI of the Local Government Act, 1929, particularly in the case of the London and North Eastern Railway, although in no case where a rebate has been properly allowed can a trader be called upon to repay it. This situation was clearly explained in an editorial article on page 592 of THE RAILWAY GAZETTE of March 29, 1935. Since April 1, 1931, the railway companies have paid into the fund rate relief on the basis of existing assessments. If therefore the assessments when finally ascertained are substantially lower than the existing assessments (the new assessments are retroactive from April, 1931) it will be necessary to make large adjustments in the fund, as it will owe to the railway companies large sums in respect of the over payments made into the fund since April 1, 1931.

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Scientific Bridge Building

ON pages 1028–31 of this issue we publish an account of the construction of the new bridge over the Little Belt. An event of considerable interest in this connection was a visit to England on April 15 last of Dr.-Ing. O. Erlinghagen, who was in charge of the work, to lecture to the Engineers German Circle at the Institution of Mechanical Engineers. Dr. Erlinghagen's lecture, which was delivered in German, was illustrated by lantern slides and two remarkable cinematograph films. The lecture opened with the exhibition of the first film, which showed diagrammatically, on the Walt Disney principle—recently used so effectively in connection with the Vitry locomotive testing station—the method of construction adopted. Dr. Erlinghagen laid special emphasis on the fact that this method, which was entirely new in principle, was an outstanding example of what can be achieved by pure research, since it was successfully carried through on the basis of preliminary calculations and experiments without any previous practical experience of the method. The diagrammatic film showed how each caisson was to be constructed in the inverted position, launched like a ship, floated to the site, turned over through 180 deg., and gradually sunk under the weight of the superstructure of the caisson, actually built whilst the latter was afloat. The cleverly constructed pictures then showed how drilling operations were to be carried out through the tubular walls of the caissons, the caissons sunk into the excavated space, and the foundations concreted up through the same tubular shafts.

The slides and the second film, with Dr. Erlinghagen's lively commentary, then showed how these steps in the process were actually carried out according to plan, despite the strength of the tidal current sometimes flowing at 10 m.p.h. in the Little Belt, which was vividly apparent in one of the cinematograph views. It was possible to realise the extent to which reliance was placed by the engineers on their preliminary calculations as one watched one of the caissons take to the water, especially at the dramatic moment when only a small margin was left between the surface of the water and the lip of the structure just before it began to float, and again during the pumping operations preliminary to the turning over of the caisson. Less spectacular, perhaps, but equally noteworthy, were the photographs of the construction on the floating caisson of the concreting plant.

In the concluding portion of his lecture Dr. Erlinghagen dealt with the superstructure of the bridge, constructed with a special high-tensile structural steel manufactured by Krupp. He drew special attention to the final act of closing each span with a connecting piece, which was done at a time when the prevailing temperature was at the appropriate degree. The audience included a number of engineers specially interested in bridge construction, and in the succeeding discussion Dr. Erlinghagen answered very fully several questions regarding particularly the nature of the bottom of the channel and difficulties due to the presence of boulders, and the final closing of the spans.

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Mixed Traffic Locomotives

ALTHOUGH it is generally accepted that coupled wheels of moderate diameter are no obstacle to the attainment of high speeds, it is significant both of the current tendency towards the extensive use of general purpose engines, and of the efficiency of modern designs of this kind, that some of the fastest day-to-day express running in Britain is now being made by locomotives with comparatively small driving wheels. Among the most successful of recent mixed traffic designs of this type must be the L.M.S.R. Class 5 two-cylinder 4-6-0's with tapered boilers designed by Mr. W. A. Stanier. On the Midland Division particularly, these engines are setting up some remarkable achievements with fast passenger trains, and our contemporary, *The Railway Magazine*, records a run on which No. 5052, with a load of 227 tons tare, covered the 92·2 miles from leaving Leicester to passing Hendon in 87 minutes, with two maxima of over 80 m.p.h., and a minimum of 60 m.p.h. at the end of the long and almost continuous climb from Bedford up to Leagrave. We have since received particulars of another run where No. 5042, with 249 tons, covered the 30·2 miles from Luton to St. Pancras, start-to-stop, in 30 min. 30 sec. An average of 75·7 m.p.h. was sustained over the 13 miles between St. Albans and Hendon, while a maximum of no less than 85·4 m.p.h.—an exceptional figure for engines with 6-ft. driving wheels—was attained at Radlett.

XUM

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Wage Cut Restoration

The British Railway Stockholders Union Limited,
25, Victoria Street, London, S.W.1.
May 22

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In view of the considerable number of letters now reaching me from stockholders inquiring what action this union proposes to take in connection with the contemplated application by the men's representatives for the complete restoration of the wage cuts, I should be grateful if you would afford me space in which to point out that the machinery for an impartial wages tribunal is now in existence and that all claims for the restoration of railway wage cuts will be dealt with by this machinery in due course.

Both stockholders and men have everything to gain from an impartial examination of this vexed question, and this the new wages tribunal will be able to give. It is, I think, in the common interest that we shall refrain from comment until the tribunal is able to announce the dispassionate and impartial verdict we expect from it. Having set up this court we must, all of us, confide to it our respective interests.

I am, Sir,
Yours very truly,
ASHLEY BROWN,
General Secretary

Speed

United University Club,
Pall Mall East, S.W.1.
May 17

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have recently listened to a speech by a British railway official in which he referred disparagingly to " this craze for speed in railway service which has filled the public mind owing to performances of the motorcar and the aeroplane." The demand for speed in railway service has, of course, nothing whatever to do with the motorcar or the aeroplane; it has existed from the very beginning of the railway era; Brunel thought it worth while to adopt the broad gauge to satisfy it.

In the early 'seventies of the last century the whole nation, including Queen Victoria herself, was giving much attention to railway matters, and a lively correspondence passed between the Board of Trade and the various railway companies, the board complaining about the frequency of serious accidents, and widespread unpunctuality ; and a volume of Parliamentary Accounts and Papers for the year 1874 contains an official reply to the President of the Board of Trade, which is worth recalling in this connection. It is written by Samuel Laing, as Chairman of the L.B. & S.C.R., and is as follows:—

It remains to deal with the other subject referred to in your letter, viz., that of unpunctuality. There is one easy and obvious way of securing greater punctuality, viz., that adopted on the Continent of running trains at much slower speeds. . . . In fact to look the matter fairly in the face I know of no means of enforcing practically any materially greater degree of punctuality than now prevails in the working of this railway than that of timing all trains to run slower. . . . Personally as a director I should have no objection to see my responsibility sheltered by the decree of a public authority extending the time of the express trains between London and Brighton from one hour and a quarter to one hour and a half . . . but as a shareholder I should deprecate it because I believe it would so inconvenience the public that it would drive away a large amount of traffic. . . . And lastly, as an individual traveller on the railway I should deprecate it because I would infinitely rather travel as at present in a time so short that I do not feel it to be irksome, taking my chance of now and then being a little behind time, rather than see an unnecessary quarter of an hour added daily to my journey under the plea of consulting my safety and convenience. I am quite sure that the immense majority of travellers would take the same view, and that if two railways were running side by side at the same hours and fares, one at forty miles an hour and the other at thirty (with all the advantage of infinitesimally greater safety and appreciably greater punctuality which slower speed would give), nine passengers out of ten would patronise the faster train.

There are now more things worth doing than there have ever been before, and time spent in passing from one desirable occupation to another should be as short as possible. So far as railways are concerned the saying still holds good, " travel time is wasted time."

Yours faithfully,
W. B. THOMPSON

Locomotive Performance in France

58, rue de Courcelles,
Paris 8e, May 17

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—With reference to the letter from Mr. G. V. O. Bulkeley, appearing on page 682 of your issue for April 12 last, I may state that the *average* coal consumption of engines, Nos. 231.701-722, working between Tours, Nantes, and Bordeaux is 2 kg. per 100 tonne-km. (for hauling 100 tonne for 1 km.). Between Vierzon and Narbonne, the 4-8-0 engines, Nos. 240.701-712, burn 2 kg. 200 per 100 tonne-km.—a very low figure over 1/100 grades.

Yours faithfully,
BARON GERARD VUILLET

Railway Rhythm

117, St. Johns Road, Tunbridge Wells,
Kent, May 11

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I heartily agree with Mr. Marillier. The subjects touched upon were far too vast to allow of adequate description of each in so short a time, while the " humour " appeared so inane and unsuitable to the occasion as to render the programme, at any rate to the ears of a keen railwayist, almost insulting!

Possibly an intelligent descriptive railway broadcast may come sometime. Apart from a few authoritative talks, the vast railway field of interest seems to have been poorly served by the B.B.C. programmes.

Yours faithfully,
R. A. H. WEIGHT

Railways and Wagon User

British Iron and Steel Federation,
Caxton House, Tothill Street,
Westminster, S.W.1, May 17

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have read with interest your editorial on the question of " Railways and Wagon User," and would respectfully submit that, taking the traders as a whole, there is every incentive for them to discharge wagons as quickly as possible, and that only in isolated cases is there undue detention without a cause. It would be interesting to see to what extent the time wagons are held in private sidings and stations has been reduced since 1913, and to what extent revenue is now derived compared with the former period.

I do not think that the railway companies will deny that demurrage now provides a useful contribution to their revenue.

Yours faithfully,
M. F. BARNARD,
Assistant Secretary

PUBLICATIONS RECEIVED

The Permanent Way Institution Journal, Vol. LIII.—The April issue of this Journal is the last edited by Mr. Edwin Treacher, whose death on March 23 last we recorded with great regret in these pages. As usual, in addition to the reports of the sectional meetings, various useful papers which have been read at meetings dealing with permanent way are printed in full.

The South African Railways, Airways, and Harbours—A Souvenir. Pretoria: Published by the South African Railways and Harbours Administration. 10 in. × 7½ in. 64 pp. Illustrated.—In connection with the Imperial Press Conference recently held in South Africa the railways administration produced a handsome souvenir brochure, a copy of which has just reached us. The text takes as its theme the quotation "There is only one undertaking of the Union of South Africa larger than the railway organisation, and that is the State itself," and from this emphasises how markedly the civilised settlement of the country has marched side by side with railway extension. One or two historical prints are reproduced to strengthen the contrast between the early days of 1860—when the first two-mile section of railway was opened—and the present comprehensive and efficient régime. The modern system of railways, road services, airways, and harbours is adequately portrayed pictorially, and succinct notes and statistics amplify the visual impression. The brochure, in green leather binding, should prove a valued reminder to the Press Conference delegates of their trip and the transport system which so well served their needs.

Cook's Traveller's Handbook to Palestine, Syria, and Iraq. Sixth Edition. London: Simpkin Marshall Limited, Stationers' Hall Court, E.C.4. 7 in. × 4½ in. × 1 in. 512 pp. Folding and other maps. Price 10s. 6d. net.—It has been a pleasure to review this book, which has been thoroughly revised and partly rewritten by Mr. Christopher Lumby, a writer of wide experience who is resident in the Near East and has personal knowledge of all the countries described, and has taken journeys for the express purpose of recording the latest developments. The five maps, Political; Palestine and Southern Syria; Central Palestine; Northern Palestine; and Palestine, Syria, Transjordan, and Iraq, are admirably clear, and the last mentioned is particularly useful in showing the relationship of the four countries to each other and the transport routes to and through them. There are plans of Jerusalem, Damascus, and Baghdad; the Baghdad plan shows the stations of the standard and metre-gauge lines on each side of the river Tigris. There are also a Palestine Exploration Fund map of excavated sites, and an appendix with two sketch maps of the monuments and sites of Palestine by Prof. John Garstang. The handbook is full of interesting information for every kind of traveller, providing him not only with the necessary details as to routes, passports, hotels, &c., but with geographical and historical notes, works of reference, &c., all brought up to date. It is well described as a handbook, being of most convenient size and shape, and well printed, and with none of the dullness sometimes associated with guide books.

Military Engineering (Vol. III, Pt. I) Bridging—1934. London: H.M. Stationery Office. 8½ in. × 5½ in. Illustrated. Stiff covers. 268 pp., index and folding plates. Price 5s. 6d. net.—This work though not dealing with bridges for carrying railways, has many useful hints to give to the railway engineer in the handling of such jobs as girder launching—up to 120-ft. spans—pile driving, the use of rails to form girder spans, the adaptation of damaged bridges to carry traffic temporarily, and the use of all kinds of block and tackle gear. Abundant diagrams and illustrations round off the volume, which is also replete with calculations, references, and tables.

Student Travel.—The 1935 edition of this handbook, published by the National Union of Students, opens with a foreword describing what student travel really is, and why it is so cheap. The prospective participant thus knows what to expect, and, provided he is prepared to forego some of the luxuries offered by commercial travel organisations, he is assured of an excellent holiday and a chance of really studying at first hand the people of the countries he visits. Many of the places touched upon by the N.U.S. tours are not included in the itineraries of the great tourist agencies, and the traveller may be sure that if he sets out to see them by himself he would miss much of the pleasure and interest afforded by visits under the guidance of this students' organisation. Europe, of course, is very fully catered for, and climbing, walking, canoeing, and camping holidays are included in the programme. A six weeks' motor tour in the United States has been arranged at a cost of £66.

Holiday Booklets.—Flying, walking, and motoring holidays are described in a series of booklets received from Dean & Dawson Limited. "Holidays by Airway" includes schedules and fares for the principal services between London and the Continent, as well as of the Spartan route, operated in conjunction with Railway Air Services Limited, to the Isle of Wight. Illustrations of typical air liners of the various companies, a plan showing the appointments of an Imperial Airways 40-seater, and aerial views of scenery make the publication an excellent piece of flying propaganda. The prices quoted are inclusive of hotel accommodation, and it is worthy of remark that a four-day holiday in Ostend with air transport to and from London now costs no more than £5 19s. 6d. Three days may be spent in Ryde for £4 7s. British and Continental motor coach tours are described in a new folder for 1935 and cover Germany, France, Belgium, and Switzerland, as well as the most popular holiday and other resorts of this country. A separate leaflet gives particulars of a seven-day *de luxe* motor coach tour through Ireland for £11 11s. inclusive. The walking holidays listed in another booklet allow for very cheap accommodation both at home and abroad in hotels, hostels and guest houses.

On Either Side.—It is a pleasant experience to join one of the East Coast route expresses of the L.N.E.R. and find that the company rates the mental activity of its passengers high enough to warrant the provision of literature presenting features of interest about the journey, such as running times, distances, and so forth. An extension of this service is performed by the "On Either Side" booklets, which, although not scattered broadcast on the carriage seats, are obtainable without charge at L.N.E.R. stations, offices and agencies. A new and more detailed edition of that dealing with the journey between King's Cross, Edinburgh, Inverness (via Aberdeen and via Dunkeld, and Mallaig) has now been published. The general arrangement, consisting of a route map with notes indicating features of interest to be seen from both sides of the train, has been retained, but its division over a larger number of pages has permitted the inclusion of more descriptive and pictorial matter. Subjects of railway as well as topographical interest are dealt with, tunnels, notable bridges, water troughs, distances and even sections of the line controlled by electric signalling, being clearly shown. The summarised particulars in the map section are amplified by more detailed reference to the capital cities of London and Edinburgh. Larger pages than in the past have added to the pictorial value of the illustrations, which include many newcomers, and the book has an attractive coloured cover showing trains passing on the Forth Bridge.

A Fluid-tight Drain Valve.—Hopkinsons Limited, Huddersfield, sends an illustrated folder describing the Series-Flow Uniflow valve for arduous drain service under pressures up to 900 lb. per sq. in. A master valve and regulator valve are comprised in a single housing and their controls are so interlocked that the regulator can be operated only if the master valve is open, thus preventing wire-drawing and ensuring fluid-tightness under the severest conditions. The compact design of the unit causes it to occupy no more space in the pipe-line than a single valve of the ordinary type.

XUM

THE SCRAP HEAD

In the cellars under Friedrichstrasse station, Berlin, are a number of public baths, which are open to travellers all night, as well as all day. There the traveller can refresh himself by a bath listening to the rumble of the underground railway and of the trains overhead. A necessary preliminary to gain admission to the baths is the purchase of a platform ticket.

* * *

THE LAST LAUGH

A ticket inspector entered a train at Chomutov, in Bohemia. He examined several tickets, and told each of the holders that they were in the wrong train. They must, he said, change at once. As his progress along the carriage continued, he found still more passengers who had made a mistake about the train. Then one of them had a bright idea, and asked the ticket-inspector whether *he* was not in the wrong train. He was! —*From "The Evening News."*

* * *

Q.—"Been to Birmingham lately?"

A.—"I was there last week."

Q.—"Go G.W. or L.M.S.?"

A.—"Neither."

Q.—"Road?"

A.—"No."

Q.—"Air?"

A.—"No."

Q.—"Then how the dickens *did* you go?"

A.—"I didn't go: I came back."

* * *

The following interesting incident of the recent issue of an 1875 ticket was recorded on Monday in a letter to the Editor of *The Times*:—

Recently I bought a first class return ticket to Paddington from Penrhyndeudraeth, North Wales. The booking clerk, while rummaging under a heap of papers, informed me that they did not have much demand for first class return tickets; but at length he produced a block of paper tickets of the old Cambrian Railway Company, yellow with age. He pointed out to me, referring to the counterfoil, that the first ticket of the series was issued in March, 1875. On the ticket issued to me it was necessary to delete the 18 and substitute 19 for the century when adding the date. The serial number of my ticket was 63, so, presuming that the demand continues at the present rate, and the book contains 100 tickets, the last of the series should be 100 years old at least when it is issued. I am now expecting that my return half may cause a mild sensation at Paddington.

* * *

Relics, nearly a century old, of the early days of British railways have been brought to light during the reconstructions of Burleigh bridge (Derbyshire) on the L.M.S.R. main line from London and Derby to Manchester. They consist of a number of stone blocks, each about 2 ft. 3 in. square and 12 in. thick, which have been identified as part of the original permanent way, laid down in 1838-1840, of the old North Midland Railway. In common with many early railways, that system used stone blocks instead of wooden sleepers for supporting the chairs and rails, particularly in cuttings. The stone sleepers found near Derby have been identified by the marks still visible of the cast-iron chairs which had been bolted to them. Since their displacement by timber sleepers they had been used to form part of the abutments of the bridge carrying the L.M.S.R. main line over the River Derwent.

* * *

Stolen from 36, Gloucester Square.—A KNIGHT BACHELOR'S BADGE; also a LARGE GOLD MEDAL inscribed—"Presented to William Woods by the Directors of the Newcastle & Carlisle Railway Company on its amalgamation with the North Eastern Railway Company"; a good reward given for any information to Sir James Woods, 36, Gloucester Square, W.2.—*From the small advertisements columns of "The Times" for Friday last, May 17.*

Egyptian State Railways, Telegraphs and Telephones

PICNIC SURPRISE TRAINS

Created to enable the public to spend a pleasant holiday away from the Capital at a fixed reduced fare of P.T. 16.

The General Manager of the Egyptian State Railways has the honour to inform the Public that the Egyptian State Railways has decided to run, during the spring season, picnic surprise trains which will convey lovers of the open air from Cairo to sites specially chosen. These sites will constitute a pleasant surprise to passengers, who will be able to pass a whole day away from the surroundings in which they usually live.

FIRST TRIP.

The first picnic surprise train will leave Cairo Station on April 29, 1935, the day of Sham el Nessim.

In view of the expected crowd on that day, two trains will run from Cairo Station to the same destination, at 8.05 a.m. and 8.20 a.m. respectively, and return about 7 p.m. on the same day.

TRAVELLING FARE.

P.T. 16 for the return journey, per passenger (even for children).

Tickets for the 1st Trip will be issued as from April 22, 1935, from the Combined Tickets Office, Cairo-Station, Telephone : 58458.

LOTTERY.

Each passenger will receive with his ticket a lottery bearing the same number as the ticket. Three winning numbers will be drawn for each 100 tickets sold. The winning numbers will entitle holders to a free journey from Cairo to Alexandria and back by the SEA EXCURSION TRAIN during the Summer Season.

MODE OF TRAVELLING.

Passengers will travel by the Sea Train coaches provided with leather-upholstered seats. There is also a Buffet in each carriage, for the sale of sandwiches and light refreshments.

Passengers have to provide for their own meals, if they do not wish to purchase food from the Buffet.

RESERVE YOUR SEATS IN ADVANCE

An advertisement from the "Egyptian Gazette" of April 19. A novelty is the presentation to passengers of lottery tickets for another trip

GREAT NORTHERN RAILWAY.—LONDON (King's-cross Station), MANCHESTER, WARRINGTON, CHESTER, and LIVERPOOL.

From London.—King's-cross Station.

Leave King's-cross.	Arrival Manchester.	Arrival Chester.	Arrival Liverpool.
6 50 a.m. } 7 30 " } 9 15 "	4 36 p.m.	4 25 p.m.	4 40 p.m.
10 0 "	3 0 "	4 25 "	4 40 "
10 15 "	8 45 "	11 20 "	11 40 "
1 45 p.m.	10 20 "		
5 0 "	10 0 "	11 20 "	11 40 "

FROM LIVERPOOL, CHESTER, AND MANCHESTER.

Leave Liverpool.	Leave Chester.	Leave Manchester.	Arrival King's-cross.
		6 5 a.m.	4 15 p.m.
		9 15 "	4 0 "
8 10 a.m.	8 45 a.m.	9 55 "	2 55 "
8 50 "		11 30 "	6 0 "
11 10 "		1 45 p.m.	9 30 "
2 15 p.m.	2 40 p.m.	5 0 "	10 0 "
6 50 "	7 40 "	9 30 "	3 30 a.m.

SUNDAYS.

Leave King's-cross.	Arrival Manchester.	Arrival Chester.	Arrival Liverpool.
5 0 p.m.	10 0 p.m.	11 20 p.m.	11 40 p.m.
Leave Liverpool.	**Leave Chester.**	**Leave Manchester.**	**Arrival King's-cross.**
3 15 p.m.	3 40 p.m.	7 0 a.m.	7 45 p.m.
		5 0 p.m.	10 0 "

Express Omnibuses run between 12, North John-street, Liverpool and Garston, in connection with Through Trains between Garston and London, King's-cross Station.

RETURN TICKETS, at 21s. First Class, and 12s. 6d Second Class, available for 7 days, and at 37s. First Class, and 17s. Second Class, available for 28 days, are issued by all Trains between London (King's-cross Station) and Staley Bridge, Ashton, Guide Bridge, Manchester, Warrington, Chester, Garston, and Liverpool.

Care must be taken at London-road station, Manchester, to ask for tickets viâ the Great Northern route.

Tickets at the above fares can be obtained at the King's-cross Station, and [for Manchester only], at the Great Northern Receiving Offices: Bull and Mouth, St. Martin's-le-Grand; 16, Fish-street-hill; 264, Holborn; 32, Regent-circus, Piccadilly; 62, and 63, Bridge-road, Lambeth; 269, Strand; 38, Charing-cross; 27, King-street, Cheapside; 351, Oxford-street; George Inn, Borough; 43 and 44, Crutched-friars.

For further particulars see the Time Tables of the Company, and the Hand-bills. By order.

King's-cross Station, March 1, 1858.

GREAT NORTHERN, and MANCHESTER, SHEFFIELD, and LINCOLNSHIRE RAILWAYS.—CHEAP EXCURSION TRAINS between LONDON (King's-cross Station) and MANCHESTER, commencing THURSDAY, 25th FEBRUARY, until further notice, as under:—

EVERY WEDNESDAY AND SATURDAY.		Morn.	EVERY MONDAY AND THURSDAY.		Morn.
King's-cross ..	.. dep.	10. 0	Manchester ..	.. dep.	10 25
Guide Bridge	.. arr.	4.40	Stalybridge	.. "	9.10
Ashton ..	.. "	5.31	Ashton ..	.. "	9.15
Stalybridge	.. "	5 35	Guide Bridge	.. "	10.45
Manchester ..	.. "	5. 0	King's-cross ..	.. arr.	5.40

Fares, 5s., Closed Carriages for the Double Journey to or from the above-named Stations and King's-cross.

Tickets issued from King's-cross on Wednesdays and Saturdays are available for return either on the Monday or Thursday in the following week.

Tickets issued from Manchester, Stalybridge, Ashton, or Guide Bridge, on Mondays, are available for return either on the Wednesday or Saturday following; and those issued on Thursdays are available for return either on the Saturday or Wednesday following.

The Tickets are not transferable, and are only available by the above Trains. By order.

London, King's-cross Station, 22nd February, 1858.

Two advertisements from the "Illustrated London News" of March 6, 1858, showing the facilities afforded by the Great Northern Railway and the M.S. & L. Railway between King's Cross and the Manchester District

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

PALESTINE

Financial Results in 1934-35

The following are the principal figures relating to the Palestine Railways during the year ended March 31, 1935:—

	£.P.	£.P.
Receipts passenger	195,347	
,, goods	330,211	
,, miscellaneous ...	48,056	
,, Total		573,614
Operating expenditure ...	288,827	
Interest charges (5 per cent.)	157,140	
Renewals	56,700	
Capital improvements ...	76,953	
Total expenditure		579,620
Actual deficit...		6,006

Although the actual deficit was some £P.6,000, this was due only to the procedure whereby the first charge on earnings is interest on the Treasury guaranteed Palestine Loan (1927), amounting to just over £P.157,000. But in effect, in spite of meeting exceptionally heavy expenditure on renewals and capital account improvements out of revenue, the surplus available was about £P.151,000, the equivalent of just under 5 per cent. on the capital valuation.

The development of, and movement of traffic in the country continued unabated and the influx of capitalists from Central Europe appeared to be endless. The administration was hard pressed to cope with the seasonal peak traffic during the year, both passenger and goods, as the orange export and tourist seasons synchronise, and both were responsible for exceptionally heavy traffic. New locomotives and wagons are on order from the United Kingdom and work according to an intensive programme of maintenance has been begun.

ARGENTINA

The Transportation of Road Materials by the Railways

An application by the Argentine railways asking that materials for road-making should pay the full freight when the work is carried out by private contractors and not by the Government, has been rejected by the Ministry of Public Works. In their memorandum on the subject, the railways pointed out the unfairness of obliging them to carry, at half the ordinary rate, materials for the construction of roads designed for the use of their competitors. This view was upheld by the Attorney-General, who expressed the opinion that the 50 per cent. rebate was not applicable to materials which were not actually the property of the Government at the time they were carried by the railway. On the other hand, the Attorney to the National Treasury maintained that the rebate in question should be conceded irrespective of the ownership of the materials, if these were to be used in the construction of public works such as the national roads, and the decree seems to be based on the questionable principle that the destination of the materials and not their ownership is the factor to be taken into account when deciding whether the rebate is applicable or not. The decree declares, however, that the rebate does not apply to tools or implements which, although used in the execution of public works, are not an integral part of them; nor does the reduction apply to the tickets of contractors' employees.

The decision arrived at is another instance of the unfair way in which the Argentine railways are exploited in the interests of their road competitors, and furnishes one more argument in favour of the bill providing for the co-ordination of the national transport services, in order that these may be placed on an equal footing as regards tariffs, expenditure and working regulations.

Railway Telegraph Service and the Post Office

The Director-General of Posts and Telegraphs has requested the Argentine Government to issue a decree prohibiting the railways from accepting public telegrams for transmission in places where Government telegraph offices exist, on the grounds that the railway telegraph service competes with the P.O., which is thereby losing revenue. Under the proposals drawn up by the postal authorities, public messages could be accepted by the railway telegraph offices only under the following conditions: (*a*) If no Government office exists; (*b*) If the Government lines have been destroyed or interrupted; or (*c*) If, for special reasons, such services are authorised by the Government.

The Board of Railway Representatives and Managers lodged a protest with the Director-General of Railways, pointing out the obvious objections to such a scheme, and the fact that Congress alone has the authority to legislate in a matter of this nature. In a press interview on the subject, Dr. Leguizamon (Chairman of the Local Boards of the B.A.G.S. and B.A.W. Railways and of the Board of Railway Representatives and Managers), observed that, in view of the general character of the organisation, it was both illogical and inconvenient for railway telegraph offices to be open to the public in some stations and not in others; and also that in the event of a breakdown in the Government lines, it would be impossible to improvise a public telegraph service at a moment's notice. Dr. Leguizamon explained that the railway telegraph service did not compete and had never been intended to compete with the national telegraphs, but was merely supplementary to these. In some districts, the Government telegraph offices were open only from 8 a.m. to 8 p.m., and in others they did not open at all on Sundays. Without the railway telegraph services, such places would therefore be temporarily isolated from the rest of the country; a state of affairs which was not only very inconvenient, but in certain circumstances might even be serious.

INDIA

Capital Programme for 1935-36:—Great Indian Peninsula Railway

On the G.I.P. Railway, the Capital and Depreciation Fund Programme of expenditure for 1935-36 totals Rs. 133·20 lakhs after adjustments. On this railway no new construction is provided for. The rolling stock programme is almost entirely one of betterment and involves an expenditure of Rs. 48·43 lakhs from the Depreciation Fund. A sum of Rs. 31·40 lakhs will be spent on track renewals, Rs. 17·41 lakhs on bridgework and Rs. 40·22 lakhs on other structural and engineering works. About Rs. 17½ lakhs will go towards the strengthening and reconstruction of some of the important bridges on the line in order to remove speed restrictions and allow the use of heavy locomotives. In order to permit the intensive use of locomotive power, a programme of remodelling of loco-sheds and station yards has been drawn up and a sum of Rs. 11 lakhs has been allotted for this purpose.

North Western Railway

The net allotment for the Capital and Depreciation Fund programme on the North Western Railway for 1935-36 amounts to Rs. 206·19 lakhs. A small sum of Rs. 4,000 will be spent on the completion of the Chiniot-Khushab Railway, but otherwise the whole expenditure is to be devoted to open line works. The rolling stock programme involving a net expenditure of Rs.25·50 lakhs from the Depreciation Fund is mostly confined to betterments, but the purchase of two diesel electric locomotives at a cost of over Rs. 7 lakhs is provided for. A heavy track renewal programme is contemplated, the expenditure budgeted under this head being Rs. 138·73 lakhs. The allotment for bridgework and other structural and engineering works amounts to Rs. 74·84 lakhs. Sufficient funds under works in progress have been provided to push on with the remodelling, including power signalling and track circuiting, of the Delhi yard: a sum of Rs. 5 lakhs is provided for the remodelling of Khan Alampura, this work promising a return of 10 per cent. The construction of the combined office buildings for the Railway Clearing

Accounts and for the Indian Railway Conference Association and of quarters for their staff is urgently required to alleviate the present unsatisfactory state of affairs. The cost of construction has been estimated at Rs. 38 lakhs and a provision of Rs. 5 lakhs has been made for the year 1935-36. A start will be made on a new central hospital at Lahore, estimated to cost Rs. 7½ lakhs. The provision of Rs. 4 lakhs to move Chichoki Mallian Junction to Sheikupura is a move towards meeting a long standing public demand. Work is to be started upon the raising of the spans of the Jhelum Bridge, which is necessary in view of the rise in the river bed during the last few years. The programme of strengthening old bridges is to be continued.

Locomotive Building in India

The question of the manufacture of railway locomotives in India has been under investigation for some time. An official statement in this connection was recently made in the Legislative Assembly by Mr. P. R. Rau, Financial Commissioner of Railways. He stated that an investigation was being made into the possibilities of building workshops in India for the production of broad gauge locomotives and boilers. The technical advisers of the Railway Board have already completed an inquiry into the cost of production and the question now under consideration is whether a venture of this kind is likely to prove remunerative. According to Mr. Rau's statement, the manufacture of metre gauge locomotives has for some time past been undertaken at the B.B. & C.I. workshops at Ajmer in the belief that the ultimate cost of the locally-built locomotives would be less than the cost of importing them from abroad. In recent years about 15 locomotives a year have been turned out at Ajmer, representing practically the entire metre gauge requirements of the B.B. & C.I. Railway and, as these have been such exceptional years, this is about 50 per cent. of the average number of locomotives of this gauge purchased by India during the last five years. To a non-official suggestion that the manufacture of broad gauge locomotives and boilers should be started in India even at a little economic disadvantage, Mr. Rau gave the assurance that this view, as also all relevant matters, would be borne in mind in making a final decision on the question of policy.

New Design of Third Class Coaches

It is understood that a new design of third class coach has been completed and will shortly be placed before the Central Advisory Committee for Railways. Mr. P. R. Rau has also recently informed the Assembly that the State-managed railways had been instructed to furnish the Railway Board with estimates of initial and recurring costs for providing electric fans in inter-class carriages. In this connection it would be interesting to know if the Standards office has considered the question of air-conditioning coaching stock generally, and new coaches in particular.

EGYPT

Greater First Class Comfort

To improve first class accommodation on expresses, 40 new coaches are urgently required, 15 of them immediately. It is proposed to substitute Pullman cars for first class coaches but in principle the ordinary first class fare only will be charged—10 per cent. of which will go to the International Sleeping Car Company—except when the cars are on fast or "de luxe" trains when a supplement, payable to the railways, will be added. The Pullman stock of twelve cars at present in Egypt will have to be augmented, but meanwhile the existing cars will be fitted with air-conditioning plant at a cost of £E.800 a car.

The Sleeping Car Company has at present to pay about £E.1,000 customs duty and £E.500 in freight charges upon every car sent to Egypt, and as the total payments on these accounts upon the number of new cars required will be very heavy, the State Railways are expected to ask the Government to waive the customs duties, on the grounds that the company is being put to heavy expenditure in the provision of air-conditioning in both old and new cars. There are said to be many surplus cars lying idle in Europe that could be sent to Egypt. The Sleeping Car Company agreement is to be extended for a period of 10 years.

ITALY

Closing of Railways and Substitution of Road Services

The power conferred upon the Ministry of Communications at the end of 1932 to close any line of railway and substitute road motor services has so far been used sparingly. Acting on the advice of the State Railways, he has, however, now decided to make an experiment on a large scale, and has selected for the purpose the western half of the Istrian Peninsula. The lines to be closed run from Trieste to Parenzo via Buie and Montona (123 km. = 76 miles), and from Canfanaro to Rovigno (21 km. = 13 miles). Both are narrow gauge lines and were constructed by the Austrian Government long before the war, when Istria still formed part of the Austrian Empire. The natural resources of this mountainous peninsula were few and the lack of water made even agricultural development very difficult. Since its incorporation with Italy the Fascist Government has spent large sums of money upon irrigation there, and the Istrian Aquaduct completed in 1933 is one of the largest engineering feats of its kind in Europe. But although conditions have considerably improved, the two railways serving the area have been seriously handicapped by steeply graded switchback lines, over which only very low overall speeds are possible, and the Trieste-Parenzo journey can be made in less than half the time by car.

The new road services will, as from June next, be run by the Istituto Nazionale dei Trasporti, a forwarding and transport concern which was created a few years ago in co-operation with the State Railways. Simultaneously all the other existing passenger and goods automobile services in that part of Istria will be taken over by this company. This change of policy will leave only one railway in Western Istria, the main standard gauge line from Trieste to Pola, the principal Italian naval base on the Adriatic.

Other lines South of Rome to be Closed

Other lines that are to be closed are the Velletri—Segni Paliano (24 km. = 15 miles), Velletri—Priverno Fossanova (64 km. = 40 miles) and Formia-Sparanise (50 km. = 31 miles), and these will be replaced almost at once by road motor services of the Istituto Nazionale dei Trasporti. Velletri is situated midway between the Rome-Naples Direttissima and the old Rome-Naples line, and is served by Segni-Paliano station. Priverno-Fossanova and Formia are stations on the Direttissima and therefore directly connected with Rome so that the railway connection via Velletri and Sparanise respectively is now no longer necessary.

MANCHUKUO

Payment in Kind for the Chinese Eastern Railway

Now that the transfer of the Chinese Eastern Railway has been accomplished, that part of the question relating to part payment in kind is being taken in hand. A Soviet economic mission headed by M. Kisilev, has arrived in Japan to deal with the selection of goods to be sent to Soviet Russia in part payment under the terms of transfer.

BRAZIL

North Western Railway

According to statements made by the new General Manager of the above system, Dr. Alfredo Castilho, the Improvements Association, formed in 1934 by the São Paulo State Government (owners of the Sorocabana Railway) and the Paulista Railway Company, with a subscribed capital up to 40,000 contos, was progressing well with the more urgent re-construction and re-equipment works on the Noroéste (North-Western) Railway. The road bed of the new spur-line between Araçatuba and Jupiá, work on which was proceeding from both ends simultaneously, was expected to be ready

within a year, there being only a few kilometres still to be completed; in this connection the association intended in the near future to call for tenders for the supply of 5,000 contos' worth of permanent way materials. Drainage and relaying in the swampy areas of Matto Grosso—matters of paramount necessity in order to avoid the periodical interruptions of traffic between Miranda and Porto Esperança in the rainy season — were already being undertaken, and other important works in hand were stone ballasting, and thorough overhaul of bridges and trackwork, with replacement where necessary.

As regards rolling-stock, the association had been asked to acquire four Mountain type locomotives, to be used mainly for cattle traffic from Matto Grosso; orders for new passenger, goods, and cattle stock were also expected to be placed this year. The enlargement of the workshops at Baurú and supply of additional machinery were matters demanding immediate attention, and the building of a new station there depended only on the approval of the Minister of Transport.

VICTORIA

Better Farming Train

The Better Farming Train has recently completed its 38th tour, and its value for development purposes and the education of the primary producer continues to increase. It has been described as an agricultural college on wheels, and although provided by the Railway Administration, it is staffed and stocked by the Department of Agriculture. The latter department also arranges for lectures and demonstrations on a wide range of subjects. The following places were visited in the course of the recent tour: Tempy; Underbool; Murrayville; Ouyen; Mildura; Merrinee; Merringur; Werrimul and Redcliffs. The recent tour was again financed by the Commonwealth Bank Board from its Rural Credits Development Fund, a sure sign that the true value of this form of development policy is thoroughly appreciated.

Cost of Flood Damages

The serious floods that occurred in the Gipsland area during the past winter, and were described in THE RAILWAY GAZETTE of March 15, are now stated to have cost the railways £51,000 in repair works, a figure which is nearly twice the total expenditure on flood repair works carried out by the Railway Department on all parts of the system during the past ten years.

Rolling Stock Developments

The Victorian Railways Administration has adopted as standard practice for "IZ" type open goods wagons, which have a capacity of 27 tons, the all-welded method of construction. Some 180 of these vehicles were built on this principle during 1934. The equipment of rolling stock with automatic couplings is proceeding steadily and an additional 1,400 wagons and 50 locomotives were fitted with these couplings during the past year. In addition 43 coaches were converted for the fitting of automatic couplings.

FRANCE

P.L.M. Report for 1934

M. André Lebon, Chairman of the Paris, Lyons and Mediterranean Railway, presented the report for 1934 at the annual meeting of shareholders on April 30. The report shows total receipts of fr. 3,035 million, compared with 3,186 million in 1933. Expenditure amounted to 2,979 million, against 3,261 million the previous year. Operating income for the year was thus fr. 56 million. This compares with a deficit of 75 million for 1933. But after all capital and other charges, amounting to 895 million, the total deficit for the year payable by the Common Fund of the French Railways is fr. 839 million.

Despite a persistent decline in traffic, the results for 1934 improved slightly because the recent legislative measures in aid of the railways had begun to take effect. Reduction of passenger and luggage taxes brought increased receipts of fr. 130 million. General reductions of wages, which came into force on April 20, 1934, cut down expenditure by 65 million and readjustment of the pension system effected a saving of 100 million. But for these three measures, the total deficit of the P.L.M. would have been fr. 1,134 million. Other legislative measures, including rail and road co-ordination have not yet given appreciable results. The P.L.M. has concluded agreements with road passenger transporters in several departments, but nothing has been done concerning goods transport co-ordination. A provisional agreement for waterway traffic in the Rhone Valley has been signed.

Increased Use of Railcars

Improvements in timetables had been made during the year. Some little-used trains had been taken off, representing a reduction of 2,500 train-miles a day. A further reduction of 5,625 train-miles a day was in view for the summer services. The P.L.M. had 41 railcars running on December 31, 1934 and since last year the increase in these services totalled about 2,250 railcar-miles a day. This summer there would be a further daily increase of about 3,400 railcar-miles. It is still too early, states the report, to calculate the prime cost of the railcar, which at present involves exceptionally high expenditure in upkeep and repairs, but it is estimated that the cost of a railcar-mile, including amortisation, is about half the cost of a train-mile. Future railcar policy will depend largely on rail and road co-ordination agreements.

During the year the P.L.M. had appreciably extended door-to-door services for passengers, luggage and goods in towns and villages. It had increased rail and road connections by agreements with bus companies for the issue of joint rail and road tickets. The agricultural department of the company had intensified its propaganda concerning the better service provided for produce at reduced prices. But despite all efforts, every branch of traffic had declined; fast goods receipts were down by 6·7 per cent. and slow goods by 9·6 per cent.

Northern Railway Meeting

Baron Edouard de Rothschild presided at the annual general meeting of shareholders of the Northern Railway of France (Chemin de fer du Nord) on April 29. The report for 1934 showed receipts of fr. 1,708 million and total expenditure of 2,206 million, including capital and sinking fund charges. The deficit thus amounts to fr. 498 million. Including supplementary charges of 20 million, the deficit falling on the Common Fund is fr. 518 million.

During the year the Nord had reduced its expenditure by fr. 224,500,000, stated Baron Rothschild, and further efforts would be made to effect economies. On the operating side, the company had attempted to meet the demand for fast and uninterrupted travel in competition with other means of transport. He pointed out that to extend their commercial activities, the railways needed simplified and flexible rate schedules. In conclusion, Baron Rothschild emphasised the urgent need of legislative action to enforce a well-defined scheme of rail and road co-ordination.

Referring to the railcar as the most striking example of new developments, the report states: "Although it appears probable that railcars meet the demand for a flexible and economical means of transport, it must not be overlooked that they do not relieve the railways of the burden of fixed charges. Hence in the case of certain branch lines, it may prove more advantageous to substitute the road for the rail. But within the limits of the tasks to which it is especially adapted, the success of the railcar is already undeniable."

CHINA

Nanking-Shanghai Railway

As a result of the double tracking of the Nanking-Shanghai Railway between Shanghai North station and Nansiang [recorded in our issue of May 17.—ED., *R.G.*], an augmented train service was commenced between Shanghai and Nansiang from May 1. Nansiang and Chenju stations have been rebuilt and a new station has been constructed at Chungshan Road, Shanghai, and an additional platform has been added at Shanghai North station.

XUM

IMPRESSIONS OF OVERSEAS TRANSPORT

XIX—The policy of the Victorian Government Railways is to develop the country and create wealth, rather than to make profits

By A. W. ARTHURTON, formerly Secretary, British Railways Press Bureau

THE Victorian Railways are not " Victorian " in the usual sense of the term. On the contrary, they have become a very modern system of communication under the capable administration of Mr. Harold Clapp, Chairman of the Railway Commissioners. Mr. Clapp, when I called to see him, had just returned from a trip to America, Great Britain and the Continent, which he had been deputed to visit by the Victorian Government for the purpose of studying at first hand the evolution of railway administration and practice arising from depressed and severely competitive conditions, together with the results which are being derived from new types of equipment. Improvements in locomotives, welding activities in rolling stock and rail joints, automatic couplers, train control, and other modern developments are already features of Victorian railway practice, and I gathered that the results of Mr. Clapp's investigations abroad are likely to be of pronounced advantage to the railway system as well as to the State.

Victoria is remarkably well served by railways, scarcely any appreciable area of arable, pastoral or non-mountainous land within its borders being more than 10 miles from some portion of the railway system. The policy of the railway administration throughout its history has been to provide developmental railways rather than lines designed to pay dividends, and it has never been desired to turn them into a profit-making concern. They have, however, been the means of returning to the country in other directions an amount of wealth which would not otherwise have accrued. A notable example of this is provided by the Mallee district in the north-west of Victoria. This has an area of over 11,000,000 acres which, until the eighties of last century, were regarded as worthless and were shut off by a high vermin-proof fence. Today, thanks to railways and a wonderful water supply system, it is dotted in every direction with prosperous settlements and towns, and countless thriving farms.

Recent developments in locomotive traction have been made with the aim of meeting modern demands for increased efficiency, combined with proper economy. Today the tractive effort of the most powerful goods locomotive is 80 per cent. greater than the standard of 15 years ago. Developments of this nature have contributed largely to that most important factor in the economics of railway operation, *viz.*, savings in train mileage. Marked improvements have been introduced in methods of lubrication. Superheating, the fitting of larger boilers, and improved front end design, have played an important part in securing from each ton of coal consumed approximately 25 per cent. more productive work than was being obtained 10 years ago. Improvements in brake equipment have also been made.

The latest type of passenger locomotive is the 3-cylinder Pacific, weighing 195 tons, with a tractive power of 41,100 lb., which has been introduced for the purpose of eliminating double heading of the Melbourne-Sydney express and to run without re-coaling to the Victorian border, a distance of 187 miles. Pacific type locomotives have been hauling these expresses between Melbourne and Albury for some time past, and have reduced the journey time by half an hour. A heavier type of goods locomotive (2-8-2) has been introduced to handle more efficiently the huge trains now being operated. This type of engine weighs 185 tons and has a tractive power of 37,040 lb., or 46,040 lb. with the booster operating.

The boilers of new locomotives are of liberal dimensions, especially as regards fire-box and grate area, for burning the low-grade black coal from the State coal mine, which has a low calorific value of 11,500 B.T.U. and an ash content of 12 per cent. Later types are superheated. The Walschaert valve gear has been adopted as standard practice and modern appliances, such as the shaking grate, ash ejectors, compressed air for the operation of the ashpan door slides and speed recorders are installed. The capacity of Westinghouse pumps and reservoirs has been increased; straight air brakes have been introduced on the larger locomotives to permit of better control of the " slack " on long trains; and automatic appliances, such as governors and feed valves, have been installed to assist the drivers to use the equipment as a whole to the best advantage.

Railcar services

Operating expenses on lines serving sparsely settled districts have been considerably reduced and road competition countered to some extent by the introduction of petrol-driven rail vehicles. The cars are designed on the " pay as you enter " principle and are normally operated by one man. The passenger capacity is 37 persons and a light trailer is used as required. Double-ended cars have also been introduced with a seating capacity of 56. The drive on these cars is novel, the power being transmitted from the engine through a 3-speed gear-box to both axles of one bogie. The latest development is the petrol-electric car designed for a speed of 60 m.p.h. on level track with trailer attached. Ten cars are now in service, the latest type carrying 54 passengers. Motor-cars, fitted with flanged wheels and suitably converted for running on rails are used by railway supervising officers to travel expeditiously when train schedules are not suitable over their districts. Railway patrons can also travel by a motorcar on rails, run to a special schedule to suit their convenience.

Greater safety and greater comfort have been the ideal of the Victorian railways. These were the considerations which prompted the construction of all-steel dining cars —the first of their kind built in Australia—and the all-steel Pullman sleeping cars, which are in service on the interstate express trains. Powerful electric headlights on long distance and suburban trains and the most modern warning devices of the " wig-wag " or flashing light type at level crossings are recent contributions to safety.

Track circuiting is being gradually extended throughout the system. In the electrified area automatic signalling has increased the safety as well as the capacity of the lines, while automatic stops still further increase the measure of protection. The gradual change from the semaphore to the colour-light signal is the result of scientific experiment and tests of the range of perception of the human eye.

OUR CENTENARY—MESSAGES FROM READERS

As announced in our May 3 issue, "The Railway Gazette" and the journals incorporated with it have completed 100 years of continuous publication

THE following is the third instalment of the many messages we have received in connection with the centenary of THE RAILWAY GAZETTE and the various railway journals now incorporated with it, the earliest of which made its first appearance on May 1, 1835. In expressing our thanks to all who have written, may we say how greatly we value their appreciative and encouraging messages.

M. P. Ghilain, General Secretary, Association Internationale du Congrès des Chemins de fer, Brussels.

I have read in your last two editions some very interesting articles on and references to the centenary of THE RAILWAY GAZETTE. I may say that I am in agreement with the numerous correspondents who addressed to you their congratulations on this occasion.

THE RAILWAY GAZETTE has for many years been one of the best friends of our Association, and we have on very many occasions found in its columns valuable information with regard to railway developments and progress, not only in England, but in all parts of the world. I am very pleased to take this opportunity to send you my best wishes for the future.

Mr. M. F. Ryan, C.B.E., General Manager, Buenos Ayres & Pacific Railway, Buenos Aires.

We extend to you hearty congratulations on having completed 100 years of continuous and successful publication, and wish to state that we have always found THE RAILWAY GAZETTE very instructive, useful and interesting. Our officers find it of great assistance in developing the technique of railway operating and maintenance, and we feel sure that it will continue to be a help to them.

Mr. H. Chapman, C.B.E., General Manager, The Beira & Mashonaland & Rhodesia Railways, Bulawayo.

I learn with pleasure that THE RAILWAY GAZETTE has completed 100 years of continuous publication.

Will you please accept my hearty congratulations upon this unique achievement. During the 33 years I have been associated with the railways of Rhodesia, and previously with the old Midland Railway of England, THE RAILWAY GAZETTE has come to be regarded by me as a publication providing interesting and up-to-date comment upon railway work in all parts of the world. With good wishes for the continued success of the GAZETTE.

Mr. T. H. Watermeyer, General Manager, South African Railways and Harbours, Johannesburg.

On the occasion of the celebration of its centenary, I desire to avail myself of the opportunity to congratulate THE RAILWAY GAZETTE on the fulfilment of so long a period of usefulness.

To those who are concerned with the problems of railway management, engineering and operation, and particularly to the student imbued with the desire to acquire knowledge based on the experience of others, the columns of the GAZETTE, reflecting as they do current and prospective trend and thought in the sphere of transportation, are of inestimable value, and it is the sincere wish of the South African Railways as a whole that they may long continue to do so.

Mr. S. P. Flowerdew, Acting General Manager, Nyasaland Railways Limited, Nyasaland.

May I offer my hearty congratulations on the occasion of the publication of the centennial issue of THE RAILWAY GAZETTE and its related journals. There can be few railway officers in the English-speaking world to whom the GAZETTE is not a valued friend of old standing, or to whom its pages have not been an unfailing source of interest and profit, and I wish the GAZETTE many more years of vigour and prosperity.

I find it difficult to evaluate the different features of the paper, for the reason that I consider its catholicity the most important characteristic. In these days of intensive effort every phase of railway operation is of interest, and every record of new development of value, and I hope that you will continue to present to your readers as wide a survey of the varying factors affecting the transport industry as you have in the past.

Mr. C. C. Verrinder, formerly Agent General in France for British Railways.

I wish to send you my very hearty congratulations on the occasion of the centenary of THE RAILWAY GAZETTE, and to say how useful it is to people like me who have performed service abroad in keeping them up to date with English railway affairs.

Since my retirement I should have lost touch very much without it. My acquaintance with *The Railway News* and *Herapath's Railway Journal* dates back a great many years. It was my privilege, as a very small boy, to be entrusted with the cutting of them for my father's perusal. In comparison with the present-day handsome buff-covered publication they were very small and modest. Wishing you much prosperity and success in the future.

Mr. C. E. Spurgeon, Chief Mechanical Engineer, Egyptian State Railways, Cairo.

I offer my congratulations on the occasion of the centenary of THE RAILWAY GAZETTE. I have to express my appreciation of the variety of the interesting articles published from time to time therein. Articles describing modern methods applied to maintenance to locomotives and rolling stock; also innovations in design are subjects of special interest to this Department. Again, articles describing diesel engines and diesel-mechanically propelled cars and engines, also various new types of valve mechanism, have been very helpful.

Mr. A. M. Wellington, Superintendent, San Paulo Railway, San Paulo.

It was very interesting to learn that in May you celebrate the completion of 100 years of continuous publication, an accomplishment truly worthy of congratulation. I am sure that we here share what must be a general opinion among railway staffs who live away from England, namely, that THE RAILWAY GAZETTE helps to keep us in touch with progress in railway matters in England and elsewhere in the world in an agreeable and interesting way. The variety of the matter published must surely satisfy a wide demand.

Mr. K. E. Kellenberger, Advertising Manager, Union Switch & Signal Company, Swissvale, Pa.

I wish to extend to you my congratulations upon the 100th anniversary of continuous publication of your excellent journal. I look forward with interest to the weekly receipt of each issue. THE RAILWAY GAZETTE is the only publication devoted to the railways from which one can keep up to date upon railroad developments and news throughout the entire civilised world. The editorial matter is newsy, up to the minute, and correct. Naturally, I am particularly interested in the editorial matter devoted to railway signalling, but I do not overlook the other excellent articles devoted to other branches of the railway service. We have our copies bound, and retain them for reference.

XUM

BRITISH RAILWAY ANCILLARY BUSINESSES

1934 *Results Reviewed*

NOT the least interesting sections in the annual accounts of the railway companies are those which deal with the ancillary businesses. The magnitude of these subsidiary undertakings is not always appreciated, even by some shareholders, but the fact that the gross ancillary receipts of the four group companies last year amounted to £20,845,628 is sufficient indication of the huge business involved. It is not possible to state accurately the amount of capital invested in ancillary undertakings, but the items in respect of which separate figures are given in the companies' accounts amount to over £100,000,000. The financial results of the operation of the ancillary businesses, and the varied experiences of the respective companies, provide an interesting study, and it is proposed in this article briefly to review the figures for the past year which, together with those for 1933, are set out in the following table:—

TABLE OF FINANCIAL RESULTS—1934 COMPARED WITH 1933

Company	Year	Road transport		Steamboats		Canals		Docks, harbours and wharves	
		Gross receipts	Net receipts	Gross receipts	Net receipts	Gross receipts	Net receipts	Gross receipts	Net receipts
		£	£	£	£	£	£	£	£
G.W.R. ...	1934	67,658	11,084	304,731	6,066	14,091	*Dr. 23,280*	1,974,026	88,893
	1933	65,439	12,592	296,896	2,613	14,150	*Dr. 20,546*	1,971,439	66,251
L.N.E.R. ...	1934	171,123	26,773	699,871	*Dr. 97,538*	36,052	*Dr. 9,655*	2,647,193	151,342
	1933	136,952	14,822	652,685	*Dr. 95,314*	35,316	*Dr. 13,210*	2,520,988	95,589
L.M.S.R. ...	1934	349,460	58,709	1,321,841	228,577	124.812	*Dr. 1,388*	871,806	*Dr. 14,359*
	1933	315,798	47,998	1,263,712	183,653	116,273	*Dr. 9,764*	784,608	*Dr. 64,879*
Southern ...	1934	21,156	6,291	1,124,369	122,229	1,601	357	1,035,228	291,345
	1933	20,395	5,539	1,132,593	118,324	2,452	1,206	1,018,648	292,858
Total ...	1934	609,397	102,857	3,450,812	259,334	176,559	Dr. 33,966	6,528,253	517,221
	1933	538,584	80,951	3,345,886	209,276	168,191	Dr. 42,314	6,295,683	389,819

Dealing with the undertakings in the order in which they appear in the accounts, the first to be considered is road transport. Consequent upon the absorption of passenger road services by the associated omnibus companies, the Great Western and Southern Companies have now ceased to operate any ordinary passenger vehicles. Conveyance of goods traffic by railway-owned road vehicles continues to increase, however, and each of the groups recorded an increase in gross receipts last year. The Great Western Railway Company's net receipts declined by approximately £1,500, due chiefly to increased cost of maintenance, but the other three groups recorded increased profits, with the result that the total net receipts show an increase of £21,906, or 27 per cent.

Steamboats and Canals

Generally speaking, the steamboat business improved during 1934. The L.N.E.R., however, shows an adverse balance of £97,538, due to the fall in Continental goods traffic consequent upon the operation of tariffs and quotas in respect of foreign produce and manufactures. At the recent annual meeting of the company, Mr. William Whitelaw took the opportunity of reminding shareholders that, compared with 1931, the last normal year, the L.N.E.R. Continental goods traffic decreased by 236,219 tons, or 49 per cent. The L.M.S.R. secured substantial improvements in gross and net receipts, and the Southern and Great Western Railways each recorded an increased surplus. The total net receipts of the four groups show an increase of £50,058, or 24 per cent.

The canals owned by the companies can be regarded only as so many "white elephants." In three cases these unfortunate legacies from the past hold out little prospect of net revenue, and the best the companies can hope to do is to effect what economies they can in the cost of maintenance. Unfortunately, it is a difficult matter to secure spectacular savings in canal maintenance, and it is probable that the limit of economy has been reached. The G.W.R. is saddled with the heaviest burden, its 210 miles of canal involving an expenditure of £37,373 last year in return for gross receipts of only £14,093, leaving a deficit of £23,280. The L.N.E.R. and L.M.S.R. each recorded a substantial reduction in their debit balances, however, with the result that the total deficit was reduced to the comparatively low figure of £33,966. In all the circumstances, this is a very remarkable achievement.

Docks, Harbours and Wharves

Docks, harbours and wharves constitute, in the case of three groups, the most important ancillary undertaking. The Great Western recorded a slight improvement last year, but a return of £88,893 on a capital of over £21,000,000, or less than ½ per cent., is a matter of serious concern to the management. The decreased coal exports at the company's South Wales docks is the principal cause of this disappointing result, and the only hope of improvement must rest on a revival of international trade. Incidentally, the net receipts of the G.W.R. docks in 1929 exceeded £540,000.

There was a more substantial improvement in the case of the L.N.E.R. docks, &c., but here again the net receipts of £151,342 represent a return of only just over ½ per cent. on a capital of nearly £26,000,000. There was a material improvement in the case of the L.M.S.R. compared with 1933, the net loss being reduced to £14,359, which is the smallest deficit recorded since the inclusion of dock railways and general charges in the docks account in 1928. The capital value of L.M.S.R. docks, &c., is slightly over £10,000,000.

The Southern Railway is in the happiest position so far as docks, &c., are concerned. Although it, too, has been

adversely affected by the general depression in the shipping industry, there have been compensating factors, such as a substantial increase in the fruit traffic passing through Southampton docks, which made it possible for the company to secure a surplus of £291,345, a return of approximately 2¼ per cent. on the capital of £13,183,981. The total net receipts of the four groups show an increase of £127,402, or nearly 33 per cent.

Hotels, Refreshment Rooms and Restaurant Cars

Hotels, refreshment rooms and restaurant cars constitute another very important ancillary business. The catering business is, in fact, of two-fold importance to the companies—not only does it secure, in the case of three groups, a valuable addition to net revenue, but it also provides one of the most valuable amenities of rail travel.

The British railways own no fewer than 79 first class hotels, claimed to be the largest group in the world, in addition to which they operate 666 restaurant cars and provide refreshment and dining rooms at all principal stations. A great deal of attention has been paid to catering facilities during the last decade, and many costly enlargement and modernisation schemes have been carried out. To this enterprising policy must be attributed much of the improved business of recent years.

Of particular note is the achievement of the L.M.S.R. in securing a surplus of £363,175 last year compared with £286,708 in 1933. The Southern Railway again recorded a debit balance, but it has to be borne in mind that this company's account is in respect of hotels only, the restaurant cars and refreshment rooms being operated by contractors. The total net receipts of the four groups show an encouraging increase of £111,955 or 25 per cent.

Collection and Delivery Services

With regard to the collection and delivery of parcels and goods, the cartage services are so closely bound up with the actual railway rates for the conveyance of merchandise that it is somewhat difficult to regard them as coming within the category of ancillary businesses. In fact, it was not until 1928 that, in pursuance of an order made by the Minister of Transport, the collection and delivery services were regarded as a separate business, having previously been included in Railway Working (Account No. 10).

It is obvious that the railways must be in a position to collect and deliver goods, and it is equally obvious that the addition to the railway rates in respect of these services must be such as to keep the inclusive rate on a strictly competitive basis. The collection and delivery services may therefore be regarded more in the light of "feeders" to the railway, without which thousands of tons of traffic would undoubtedly be lost to the railway undertaking.

The Southern Railway is in the fortunate position of being able to make a small profit on its cartage services, while the G.W.R. secured a substantial decrease in its loss, but the L.N.E.R. and L.M.S.R. incurred increased deficits, with the result that the total deficit increased by £126,010, or 19 per cent.

Air Services

With regard to air services operated by the companies through Railway Air Services Limited, a loss is to be expected in the early stages of a development of this nature. It is satisfactory to note, however, that the Great Western Railway reduced its loss from £6,526 in 1933 to £5,150 last year, although the mileage of air services in its territory increased by more than 50 per cent. It is recognised that some time must elapse before these services produce profits, but it is confidently anticipated that, in due course, they will become paying propositions.

The only other business of an ancillary nature is the limestone quarry belonging to the L.M.S.R., which shows a satisfactory return upon the capital of £43,335.

From the figures appearing in the total column, it will be seen that the Southern Railway benefits to the greatest extent from ancillary undertakings, due to the more profitable nature of its dock interests and the fact that it is able to operate its cartage services without loss. Curiously enough, the total net ancillary receipts of this company last year afford the only unfavourable comparison with 1933. The G.W.R. converted a deficit of £17,092 into a profit of £29,846, the L.N.E.R. reduced its deficit from £183,072 to £126,443, the L.M.S.R. recorded an increase of £103,038 in net receipts, while the Southern Railway shows a small decrease of £22,900.

The grand total net receipts of £605,749 appears somewhat insignificant in relation to the gross receipts of £20,845,628, but this is accounted for by the inclusion of the collection and delivery services which as has been indicated, have a somewhat doubtful claim to the title of ancillary business. If this business is excluded, the net receipts last year are £1,391,524 on gross receipts of £16,143,454—a much more satisfactory figure.

Finally, it has to be borne in mind that, with the exception of the canals, the ancillary businesses are of very great contributory value to the railway undertakings proper, and are responsible for bringing much business to rail which might otherwise be lost.

TABLE OF FINANCIAL RESULTS—1934 COMPARED WITH 1933 (*continued*)

Hotels, refreshment rooms and cars		Collection and delivery of parcels and goods		Air Transport		Limestone quarry		Total	
Gross receipts	Net receipts	Gross receipts	Net receipts	Gross receipts	Net receipts	Gross receipts	Net receipts	Gross receipts	Net receipts
£	£	£	£	£	£	£	£	£	£
666,849	75,468	961,867	*Dr. 123,235*	1,528	*Dr. 5,150*	—	—	3,990,753	29,846
637,826	76,863	863,992	*Dr. 148,339*	1,664	*Dr. 6,526*	—	—	3,851,406	*Dr. 17,092*
1,756,465	125,325	1,151,578	*Dr. 322,690*	—	—	—	—	6,462,282	*Dr. 126,443*
1,667,925	85,681	1,087,904	*Dr. 270,640*	—	—	—	—	6,101,770	*Dr. 183,072*
2,833,028	363,175	2,096,272	*Dr. 382,706*	2,904	*Dr. 7,244*	8,615	2,623	7,608,738	247,387
2,636,945	286,708	1,982,093	*Dr. 301,306*	—	—	6,251	1,939	7,105,680	144,349
108,772	*Dr. 3,349*	492,457	42,856	272	*Dr. 4,770*	—	—	2,783,855	454,959
104,263	*Dr. 588*	474,242	60,520	—	—	—	—	2,752,593	477,859
5,365,114	560,619	4,702,174	*Dr. 785,775*	4,704	*Dr. 17,164*	8,615	2,623	20,845,628	605,749
5,046,959	448,664	4,408,231	*Dr. 659,765*	1,664	*Dr. 6,526*	6,251	1,939	19,811,449	422,044

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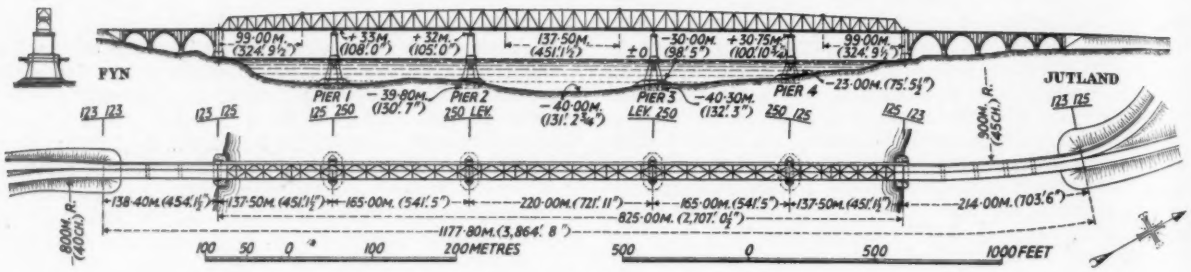
LITTLE BELT BRIDGE

To avoid the recurring cost of the train ferry it replaces and to improve communications in Denmark, a new high-level bridge spanning the Little Belt, has been built and was opened by the King of Denmark on May 14

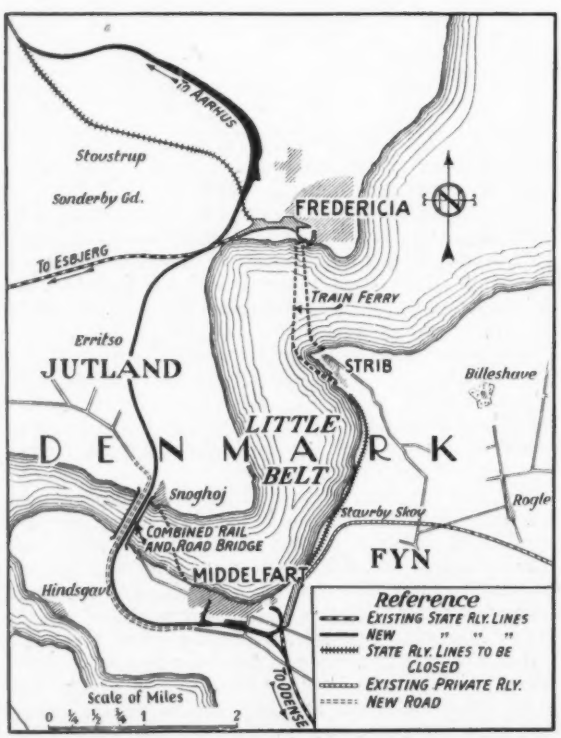


Section, side elevation, and plan of the bridge and its immediate approaches

AS briefly described in our news columns last week, the new bridge constructed by the Danish State Railways across the Little Belt, to connect Jutland and the island of Fyn, was opened by the King of Denmark on May 14. Great festivities were arranged for the occasion and many Royal Princes, Ministers and notables journeyed in two of the new high-speed diesel-electric trains—which began running on May 15 and were described in our *Diesel* and *Electric Traction Supplements* of August 10, 1934, and April 19, 1935—from Copenhagen to Middelfart, on the Fyn or Funen shore of the strait. There King Christian arrived in the Royal yacht and proceeding to the bridge declared it open.

In a prefatory speech, the Minister of Transport briefly outlined the history of the bridge and eulogised the engineers concerned, especially Mr. Flensborg, the Chief Engineer, and Professor Engelund, the scientific adviser to the State Railways, who were mainly responsible for the work. Alternative designs were received from all parts of the world and adjudged by an international committee, which unanimously selected the State Railways' design. The completion of the bridge, coupled with the new express diesel train services, he said, made this the quickest and cheapest route between Scandinavia and Great Britain and the South. His Majesty in a few words appraised the occasion as an historical and national event and the bridge as a monument to the technical ability of the present generation.

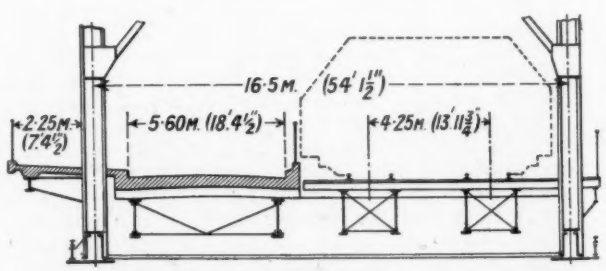
The two diesel trains, coupled together, with the King and party on board then broke a silken cord and proceeded across the bridge. Great crowds witnessed the event and also subsequent illuminations, fireworks and torchlight processions. By midnight 200,000 people and 40,000 cars had crossed the bridge.



Position of Little Belt bridge and its approaches; the old ferry is also shown

History of the Bridge

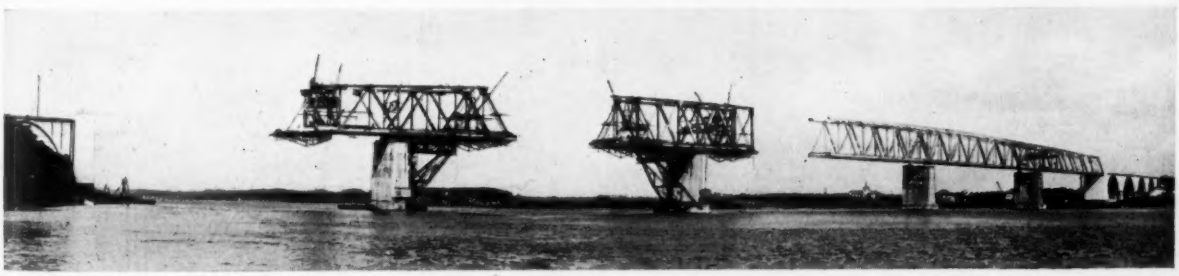
So costly were the operation and maintenance of the train ferry across this strait, that it was decided, in 1924, to construct a double-line railway bridge in its place: subsequent growth of road motor traffic also made the inclusion of a roadway inevitable, and in 1927, a combined rail and road structure was sanctioned. The contract



Cross section of main span, showing cantilevered footway, road, and railway

Aerial view of the opening ceremony of the Little Belt Bridge, from Fyn looking towards Jutland

The bridge as completed: view looking eastwards, the Jutland shore being to the left, Fyn to the right



General view of the bridge, illustrating the method of girder erection

LITTLE BELT BRIDGE

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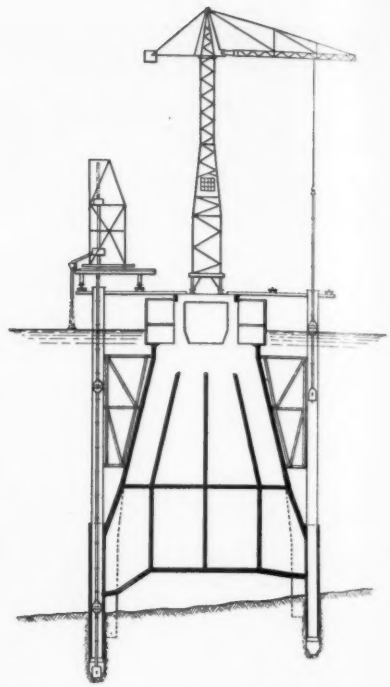
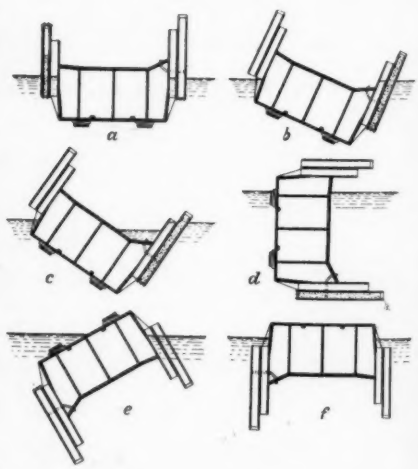


(Left) Caisson being built up in reinforced concrete prior to launching. Note the ring of tubes round it. (Right) Working platform, crane and boring plant in operation. Note the mixture of water and clay being forced out of the top of the tube under pressure

was let to the Danish firm of Monberg & Thorsen, of Copenhagen, in co-operation with Grün & Bilfinger (Manheim) Friedrich Krupp (Rheinhausen) and Louis Eilers (Hanover) for a sum of 18·5 million kroner. The total cost of the bridge will, however, be about 24·6 million kr. and, as there are very considerable approach realignments and road connections attendant, the complete scheme is expected to cost about 40 million kroner.

The map on page 1028 shows the old ferry and new bridge site as well as subsidiary works on both shores of the strait, involving entirely new stations and long approaches at both Middelfart and Fredericia, as well as land for an extensive marshalling yard and transhipment shed and locomotive accommodation near the latter town. The line from Middelfart to Strib will be partly abandoned and taken up. The main road approaches and connections and the by-pass round Middelfart will also be noticed.

Our first illustration (on page 1028) shows the maximum depth of water crossed to be 133 ft. and that at the piers 75 ft. and 100 ft. In this channel there is a strong current, and ice has to be reckoned with in winter. As steamer traffic passes through the strait, a high-level bridge was necessary. Actually, as may be seen, a clear headway of 33 m. (108 ft.) is allowed above mean sea level. This height, combined with the depth of the water, necessitated an overall height of pier, from foundation level, of 73 m. (240 ft.), and, as the girders have a maximum depth of 24 m. (80 ft.), the height of the structure



(Left)—A caisson being launched from the slipway. (Right)—The various stages of floating out and capsizing the caisson by filling tubes with ballast which subsequently discharges itself, as in d

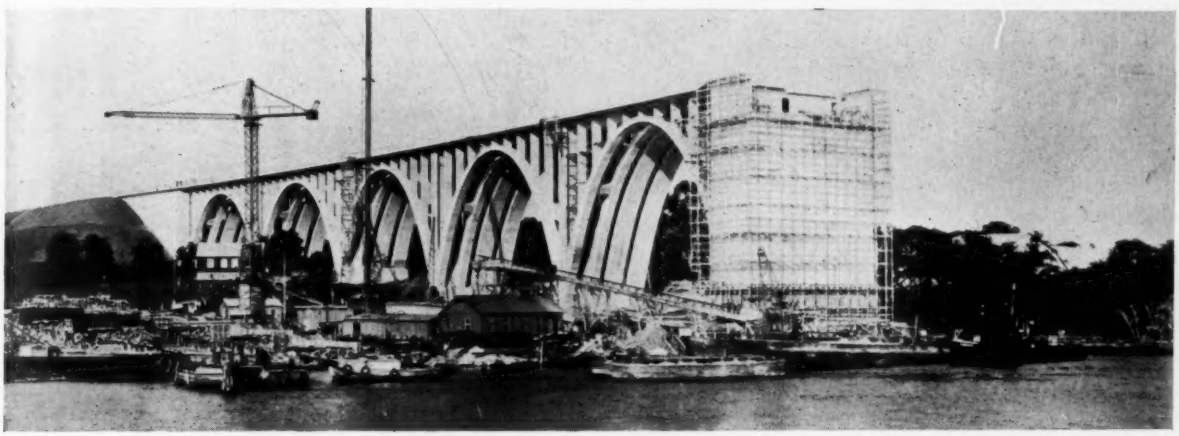
at the two central piers is about 97 m. (320 ft.). The girderwork is of an unusual design, for it is of the continuous cantilever type, with two hinges in the middle span and one in each outer span. The lengths of span and other principal dimensions may also be seen from that drawing. Some 50,000 tons of steel and 112,000 cu. m. of concrete were used. The approach viaducts consist of graceful arches as illustrated below. The largest arch is 86 ft. high and 127 ft. in span.

The abutments and the piers between the main spans and arched approaches are constructed in reinforced concrete, and the portions of the latter round about water level are sheathed in granite masonry. The upper parts of these piers are partly hollow and have rooms in their top lengths. That on the Jutland shore is founded on 196 reinforced concrete piles and the other has ordinary foundations 15 m. (50 ft.) below mean sea level.

One of the most interesting features of the construction is the method adopted for well sinking in deep water without compresed air. The caissons measure 44·8 m. × 24·1 m. (147 ft. × 79 ft.) and are from 15 to 18 m. (50 ft. to 60 ft.) in depth and were built up in reinforced concrete on the Jutland shore with the aid of the 185 ft. mast which was also used for concreting the arches (see upper left-hand illustration on page 1030). Round the edge of each well is arranged close together, a ring of vertical reinforced concrete tubes, their bottom ends shod with steel on the inside to form cutting edges. The bottom alignment of these tubes was carefully shaped to correspond with the exact levels, taken in great detail, of the bottom on which the caisson was to be sunk; this necessitated construction of the caisson upside down prior to launching from a slipway. Once afloat capsizing was effected by filling the tubes on one side with ballast—which emptied itself as the open ends of the tubes turned downwards—and by flooding different chambers as shown in the last series of illustrations on page 1030. As soon as it was right way up, each caisson was placed on the bottom with just so much water ballast that, by discharging it gradually, floating would again take place. The caisson or well walls were then built up and the well was moved out by degrees into deeper and deeper water until its final resting place was reached, the concreting meanwhile being done by a floating plant.

The next operation consisted of the erection of a working platform on the top of the well carrying two cranes and two boring machines as depicted in the top right-hand illustration on page 1030. The cranes were used to let the boring tackle down the tubes around the well. Each tube has an internal diameter of 1·18 m. (3 ft. 11 in.). The boring machines were then connected up, and operated a rotating cutting head at the bottom of the tube which loosened the clay, and this, mixing with water led down to the cutter under pressure, was forced up and carried out above the top of the tube as shown in this illustration. The well meanwhile was weighted with ballast and sank gradually as the boring proceeded. This process continued until the ceiling of the working chamber reached the bottom, when the tubes were filled with concrete and, as the clay was water-tight, it was possible to carry on the excavation in the working chamber without the use of compressed air to exclude water. Each working chamber was designed abnormally high, about 8 m. (25 ft.), for this purpose, and excavation to a depth of about 4·2 m. (14 ft.) was completed before the chamber was finally filled with concrete.

To avoid undue loading upon the clay, each pier is of cellular construction, some of the cells being filled with concrete, others with water. The shaft of the pier has thick concrete walls, heavily reinforced with rails, &c. The four main piers were constructed in the manner above described without mishap, and cost some 10·4 million kroner. The method adopted for girder erection can best be seen by reference to the bottom illustration on page 1029. This method was used for all except short gaps on each shore where ordinary scaffolding was used.



The Jutland approach spans nearing completion. Note the four separate arches forming each span, the two wider ones carrying the railway and the narrower the road and footway

With the completion of the bridge and introduction of the high-speed diesel trains the time for journeys from Copenhagen to various cities in Jutland has been greatly reduced. For instance the time to Aarhus (207¼ miles) is reduced from 7 hr. 17 min. to 4 hr. 36 min., including the 1½ hr. taken by the train-ferry between Korsor and Nyborg. The train connecting with the Harwich boat at Esbjerg previously left the latter port about 11 p.m. and reached Copenhagen at 7 a.m., whereas now the boat arrives at about 7 p.m., the train leaves at 7.10 and Copenhagen is reached at 11.55 the same night. This makes it possible to leave London at 4.10 p.m. and reach Copenhagen before midnight on the following day.

In connection with the construction of this great bridge an interesting lecture (in German) was recently delivered by Dr. Erlinghagen before the Engineers German Circle at the Institute of Mechanical Engineers, London, and is discussed in an editorial on page 1017.

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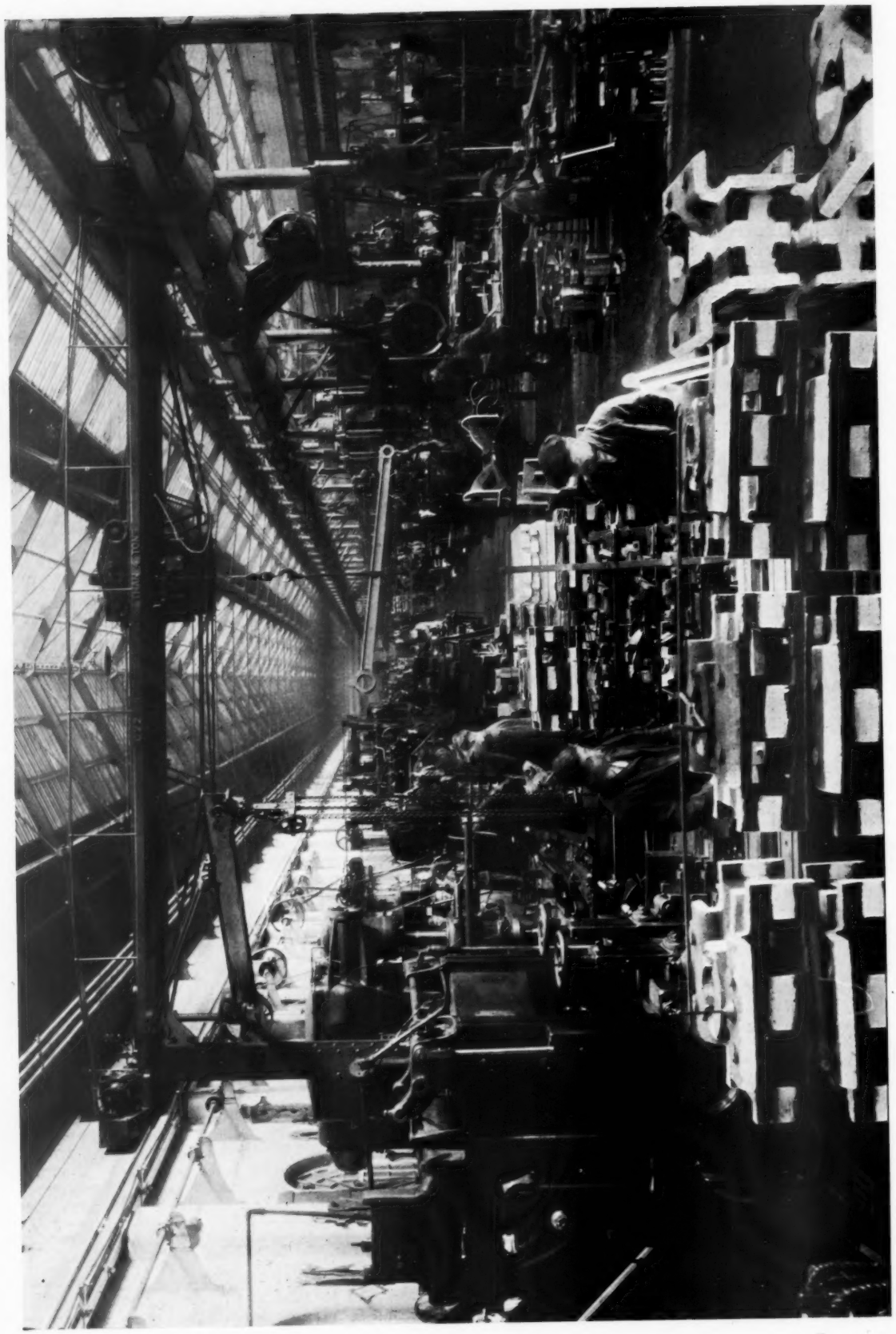

GENERAL VIEW IN NORTH BAY OF MACHINE SHOP AT CREWE WORKS, L.M.S.R.

The component parts in foreground are those of a new series of 4-6-2 express engines

NEW MACHINE TOOL INSTALLATIONS AT CREWE WORKS, L.M.S.R.

Some further additions have recently been made to the lathe and other equipment in the machine shops at these works

IN engineering workshops, especially those of large proportions wherein a variety of machining operations are normally carried out, it becomes necessary from time to time to supersede some of the older machine tools and other similar appliances by others of more modern types, and this principle applies with full force in the locomotive workshops of a railway company. In addition, as new types of locomotives are introduced having re-designed and often heavier and more intricate component parts, the need for altering and improving machining operations arises in a marked degree. Some very fine machines have within the past several months been installed in the Crewe works of the London Midland & Scottish Railway, and by the courtesy of Mr. W. A. Stanier, the company's Chief Mechanical Engineer, we recently paid a further visit to these works, when facilities were afforded for making a close inspection of the new tools and the work they were performing.

A New Lathe Installation

Our attention was drawn to a new series of lathes engaged in machining drawpin castings in steel and piston valve heads in cast iron, the work being done on a range of Ward No. 10 combination lathes. Widia cutting tools are used for the steel castings, which are roughed out at a speed of 172 ft. per min., with a feed of 176 cuts per inch, and afterwards finished turned at a speed of 255 ft. per min., also with a feed of 176 c.p.i. The cast iron piston valve heads are roughed out at a cutting speed of 175 ft. with a feed of 123 c.p.i. and finished turned at a speed of 264 ft. per min., with the same rate of feed. The machines on which this work is performed are seen in the first of the accompanying illustrations. They have been specially designed with a view to the requirements of both the high speed and heavy cutting which tungsten carbide and modern alloy tools will allow. The single pulley all-geared headstock gives 16 spindle speeds in each direction, and as all gear shafts and spindle are mounted on ball and roller bearings, an extremely high factor of efficiency is obtained at the cutting point. Speed changes are obtained by sliding gears, but the mechanism is arranged in such a way that all sliding gear motions are effected under " no load " conditions. The speed changes are secured by the movement of levers along the top of the headstock, which carries an overhead pilot bar of large diameter with a double support, one at each end of the head. This results in maximum rigidity, a very important point on lathes with a capacity for removing metal at high speed with coarse feeds. The gearbox is situated immediately beneath the front of the headstock, and provides ten rates of feed to both sliding and surfacing motions. The chasing motion or screw-cutting feed is applied to the saddle and obtained by means of a detachable leader screw and nut, the leader being driven from the gearbox, which allows the rotation to be altered as required in the ratio of 1:1, 2:1, 4:1, and by this means it is possible to cut three different pitches with each leader.

Another feature of the saddle is the quick withdraw motion connecting the cross slide to the leader nut so that both can operate simultaneously. The turret saddle is of rigid construction and the bed of the machine is a massive, well ribbed box casting of the utmost rigidity, mounted on pedestals which are integral with the main casting. The illustration shows some of the components machined on these lathes at the Crewe works, and it was obvious from the inspection made that a high degree of accuracy of machining and excellence of finish are achieved by the machines.

Another Range of High-Capacity Lathes

In the same location in the machine shop there are installed some Herbert No. 19 hexagon turret lathes and No. 10 combination lathes. These are engaged on the production of joint pins in mild steel and horn block bolts in manganese molybdenum steel. High-speed steel tools are used for the joint pins, which latter are machined at a cutting speed of 100 ft. per min., with a feed of 123 c.p.i. The bolts are rough turned at a cutting speed of 70 ft. per min. and a feed of 149 c.p.i., using high-speed steel tools and finished at a cutting speed of 185 ft. per min. and a feed of 149 c.p.i. The tools used are tipped with Ardoloy, another product of Alfred Herbert Limited, Coventry.

The No. 19 Herbert hexagon turret lathe is provided with a covered bed and roller bearing spindle, and the design and construction of the lathe are such as to provide exceptional durability with consequent reduced maintenance charges. This is ensured by the extensive use of ball and roller bearings, and automatic lubrication, whilst all parts subject to great wear are hardened. Special attention has been devoted to convenience of operation, it being possible to start and stop the machine instantly, whilst the selection of spindle speeds is obtainable with every facility by means of sliding gears and friction clutches. Mention has already been made of the covered bed. This is a vee formation with the guiding surfaces covered in all positions. The headstock, feed box, and aprons form oil baths for the gears and bearings. The headstock is arranged to drive by a single pulley from the line shaft. The turret slide is equipped with six changes of automatic feed instantly obtainable by means of the makers' patent dial feed motion.

The Herbert No. 10 combination turret lathes referred to above have been specially designed to make possible the utilisation of the greatly increased cutting capacity and endurance of high-speed alloy tools. As in the No. 19 turret lathes, the spindle is mounted on roller bearings and the guiding surfaces of the bed are completely covered in all positions; great rigidity is imparted to the bed by means of four vertical members adequately braced together. A wide range of spindle speeds, *i.e.*, 16 forward and 8 reverse from 11 to 593, are all rendered instantly available by means of levers. The equipment includes improved muti-disc friction clutches entirely unaffected by centrifugal force and readily accessible for adjustment. An automatic brake is provided for stopping the spindle. There are 16 independent feeds to both aprons, ranging from 6 to 240 longitudinally and from 10 to 400 transversely, all these being controlled by levers within easy reach of the operator, whilst the spindle can be started and stopped by any one

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A range of Ward No. 10 *combination lathes for machining drawbar castings and piston valve heads*

Herbert No. 19 *hexagon turret lathes and No.* 10 *combination lathes producing joint pins and horn block bolts*

Ward capstan lathe engaged in bolt production

of three handles located in convenient positions along the front of the bed.

Small Capstan Lathes

We were interested to note the work that was being performed in another part of the shop on two small capstan lathes—one a Ward and the other a Herbert. These were rapidly turning out bolts of various sizes and both are illustrated herewith. The Ward machine is classified as the No. 2a capstan lathe. It is capable of screwing bolts of a maximum size of 1 in. dia. and has a bar capacity of 1¼ in. dia. The machine is equipped with automatic feed to capstan slide and is fitted with a 1¼-in. chuck and bar feed motion. The lathe, although small, is a powerful machine, and is equally suitable for either chuck work or production from bar. The headstock is of the new type, allowing the fastest possible speed-changing through friction clutches running in oil. Six spindle speeds in each direction are instantly available, these speeds being arranged in three groups so that two forward and two reverse speeds are obtainable without the necessity of moving gears. The spindle is mounted on combined ball journal and thrust bearings, together with heavy duty roller bearings, and all rotating parts of the headstock are also carried on suitable ball and roller bearings. The speed range is dependent upon the speed at which the single pulley on the headstock is rotated. With the pulley driven at 450 r.p.m. a speed range from 48 to 1,020 r.p.m. is available. Driving the main pulley at 675 r.p.m. gives spindle speeds between 71 and 1,531 r.p.m., whilst the speeds obtainable with the main pulley running at 900 r.p.m. are 95 to 2,041 r.p.m. The machine is of rigid construction and of an entirely modern description. It works rapidly and accurately and has to some extent revolutionised the operations on which it is engaged.

Similarly, the Herbert No. 2s machine is light and handy, but, withal, powerful in type. It produces bolts of various sizes, the maximum size screwed being ⅞ in. dia. The spindle has a wide range of speeds—from 46 to 3,090 r.p.m. The machine is fitted with an automatic elevating holder and adapter plate for diehead. The capstan slide has two changes of automatic feeds, 80 and 158 cuts per inch, and six self-selecting stops; the feed shaft is carried in three anti-friction bearings. The saddle is moved along the bed by a hand wheel and has six adjustable stops, and the cross-slide is operated by the maker's duo-rate hand feed mechanism. The front end of the tubular framework can be moved out of line with the spindle so as to enable a new bar to be inserted from the front. These self-contained lathes are fitted with roller bearing spindle and ball bearings for all shafts in the driving box. The machine is driven by a self-contained motor for alternating or direct current, the maximum power being transmitted to the spindle of the driving box, on the left of the cabinet containing pick-off gears, which in conjunction with the three-step cone pulley provide the large number of spindle speeds already referred to.

A New Twist Drill Grinder

A machine which attracted our attention in the tool room was a newly installed twist drill grinder manufactured by Herbert Hunt & Sons, Manchester, and used at the Crewe works for grinding 2, 3, and 4 lip drills 1¼ in. to 3 in. diameter at any angle from 180 deg. to 90 deg. This machine is designed on the most up-to-date lines and is so arranged that all wearing parts are protected, it being a special point of the design that accuracy is retained whilst the machine does its work correctly and with a minimum amount of attention and the cheapest class of unskilled labour.

The drill is revolved continuously in a fixed bush while being ground, and this action produces a central point. The motion giving the cutting clearance makes two revolutions for every one of the drill, thus ensuring uniform cutting edges. The advantage of this is seen in the reduction of the amount of power necessary for driving purposes, less frequent grinding, less wear and tear of the drills, all this being due to the balanced cutting edges. Other advantages are that a flat drill of 180 deg. can be ground, also a 90 deg. angle drill with, in addition, the lip drills as already referred to. The cutting clearance can be varied at any one of these angles, which is an essential feature and equally necessary when cutting

Producing bolts on Herbert machine

New twist drill grinder by Herbert Hunt & Sons, Manchester, in tool room

hard or soft material. Bevelling the extreme corner of the cutting edge adds additional life to the drill and produces a smoother hole, and thinning the point allows the drill to penetrate more easily. All these operations can be performed without removing the drill from the original setting position.

A New Locomotive Rod Boring and Trepanning Machine

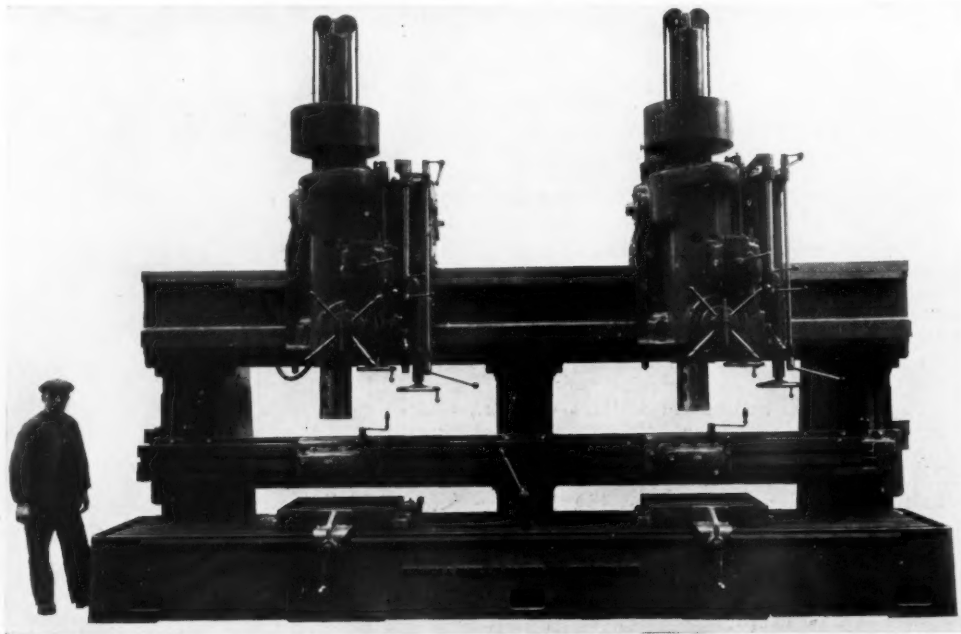
The machine shown in the concluding illustration has only quite recently been delivered to the Crewe works. It is a large boring and trepanning machine by Kitchen & Wade Limited, Halifax, and can be seen in the foreground on the right-hand side of the aisle of the machine shop in the full page reproduction on page 1032. Hitherto, in this class of machine the motors and gearboxes have been built on to the two outer columns, but this later design with motors on the saddle not only eliminates all long driving shafts, but places every change of speed, feed and spindle movement under the operator's immediate control.

The two massive heads are entirely independent of each other, and have each a 15 h.p. driving motor. The spindles (8½ in. dia.) are bored No. 7 Morse taper, and are balanced by deadweight. They have eighteen changes from 175 to 6 r.p.m., with nine rates of power feed from 118 to 10 c.p.i. and length of feed 20 in. Fine and quick hand adjustments are also provided. The spindles operate between 14 ft. max. and 3 ft. 6 in. min. centres, and machined faces are provided for the use of dead set gauges to ensure repetition of centres. The upper portion of the head embodies the gearbox—in which are hardened nickel chrome gears mounted on ball bearings in oil, on six solid splined shafts. The final gear to the spiral is of hard steel and phosphor bronze spirals, thus ensuring smooth and efficient running.

Particular attention has been paid to ease of control, and all handles and levers have been brought to the lower parts of the heads. Heavy ball bearing rollers support the heads on the broad top of the cross rail, and this, with the worm gear racking motion, provides a traverse of unusual ease and provision. A secure double lock is provided to each head.

The adjustable steadies mounted on the balanced steady rail enable the spindles to be supported close up to the work, an invaluable feature when trepanning and on heavy work. This feature also dispenses with the necessity of an initial pilot hole when trepanning, thus saving considerable time, and leaving a usable core of material for other purposes. The steadies are of the hinged type, to facilitate the removal of heavy tools and appliances. The work bed is a strong, well-ribbed box casting, 18 ft. 3 in. in length and 3 ft. wide—troughed all round for lubricant. Two auxiliary tables (with rack adjustment) are provided. Each spindle has its own motor driven pump and fittings. This is a very powerful machine, weighing approximately 25 tons.

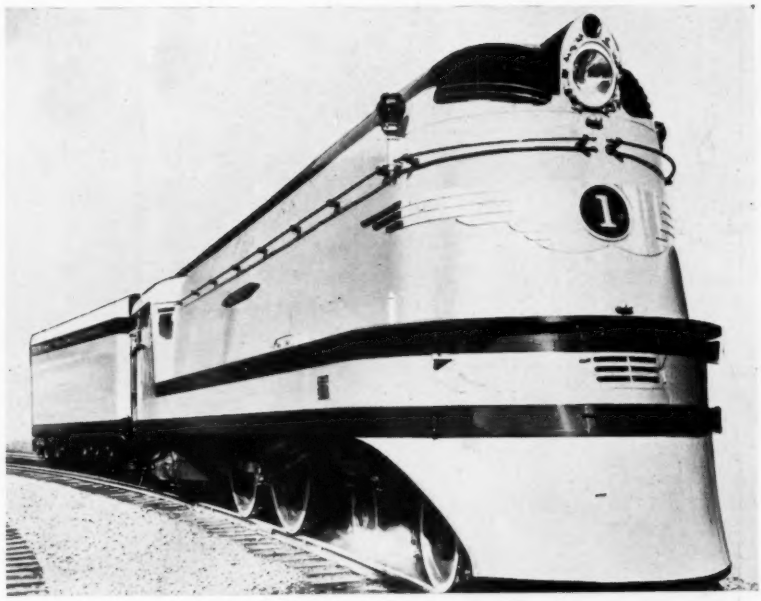
The foregoing description indicates the progressive standards of equipment which are being maintained at the Crewe works. In a future article we hope to deal with further machinery recently installed therein.



Kitchen & Wade large boring and trepanning machine used for locomotive rods at Crewe works, L.M.S.R.

ANOTHER AMERICAN STREAMLINED LOCOMOTIVE AND TRAIN

The first of two new Atlantic type streamlined locomotives, Chicago, Milwaukee, St. Paul & Pacific Railroad, for hauling the high-speed Hiawatha expresses between Chicago and the Twin Cities



BY the courtesy of the American Locomotive Company we are enabled to reproduce herewith photographs and give particulars of the new high speed, high power, streamlined oil-burning steam locomotives recently completed for the Chicago, Milwaukee, St. Paul & Pacific Railroad for hauling the new Hiawatha *de luxe* streamlined train between Chicago, St. Paul, and Milwaukee. The locomotive will be required to cover the 410 miles in 390 minutes, including five intermediate stops, at an average speed of 66 m.p.h.

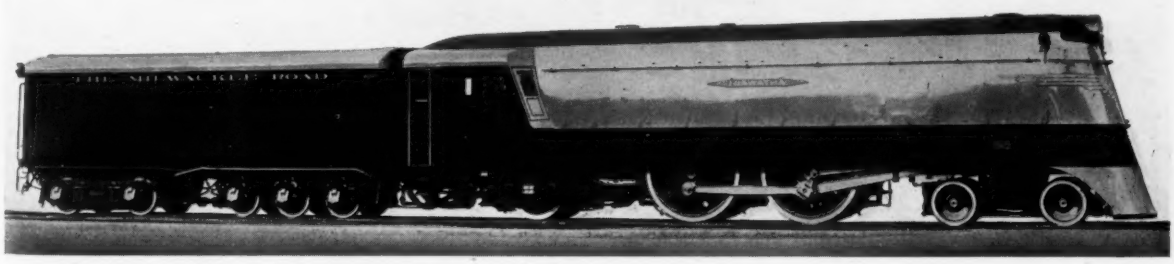
The *de luxe* passenger coaches of which the train is composed weigh approximately 50 tons each, as compared with the 85-ton Pullmans now commonly used on the American railways. Even so, the new cars are considerably heavier than many of the extremely light passenger vehicles recently introduced on American high-speed runs. They are streamlined, and the rear vehicle of each set is provided with a wedge-shaped or "beaver tail" end designed to improve the air flow past the train at high speeds. Forty passengers are accommodated in each of the day coaches, which is one-third less than usual owing to the wide centre gangway and smoking lounges at each end. The train is air-conditioned throughout.

The locomotive is of the 4-4-2 type and has a tender mounted upon two bogies, one with six and the other four wheels.

The engine in working order weighs 125 (long) tons, and the tender 110½ (long) tons; each pair of coupled wheels carries 31¼ tons, giving 62½ tons total adhesion weight. The maximum tractive power is 30,700 lb. and the factor of adhesion 4·56. The tender capacity is 13,000 gallons of water and 4,000 gallons of fuel oil. S.K.F. roller bearings are fitted on all the engine and tender axles. A series of wind tunnel tests of locomotives and trains of various lengths, contours, and degrees of streamlining was carried out by the makers in connection with the design. The coaches are equipped with Timken roller bearings.

The following are the main dimensions of the locomotive :—

Cylinders, dia.	19 in.
Piston stroke	28 in.
Wheels, coupled, dia.	7 ft.
Wheelbase, engine	37 ft. 7 in.
,, coupled	8 ft. 6 in.
,, engine and tender	78 ft. 10½ in.
Boiler, steam pressure	300 lb. per sq. in.
Heating surface, tubes	1,781 sq. ft.
,, ,, flues	1,170 ,,
,, ,, firebox	254 ,,
,, ,, syphon	40 ,,
Total heating surface	3,245 ,,
Superheating surface	1,029 ,,
Combined total	4,274 sq. ft.
Grate area	69 sq. ft.



Broadside view of new 4-4-2 streamlined locomotive for the Hiawatha high-speed express

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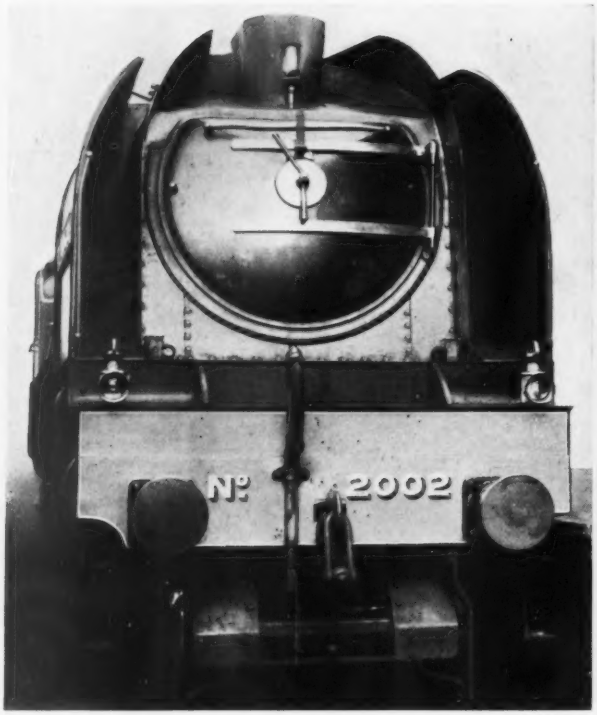
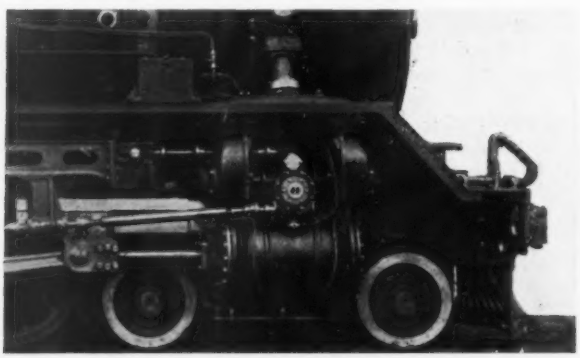
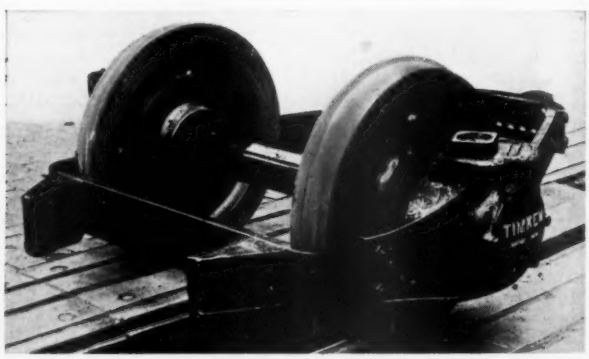
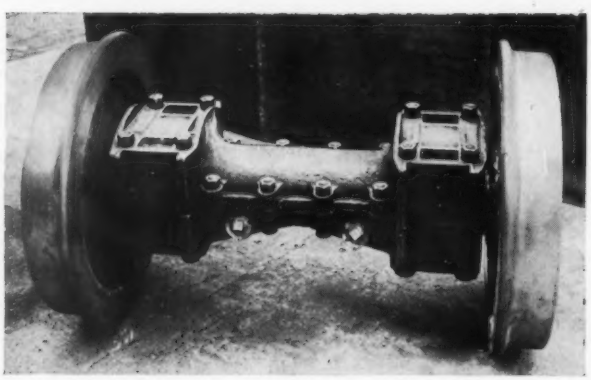


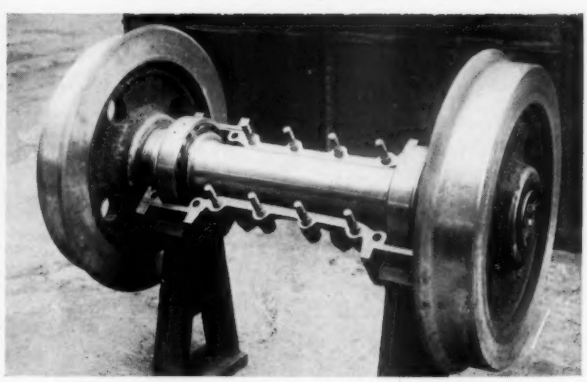
L.N.E.R. 2-8-2 express locomotive, "Earl Marischal," fitted with additional smoke-deflecting screens

New departure indicators recently installed at Paddington station, G.W.R., by the Equipment & Engineering Co. Ltd.









Of the 50 class 19c 4-8-2 locomotives recently built by the North British Locomotive Co. Ltd., for the South African Railways, and described in "The Railway Gazette" of November 16, 1934, two have roller bearing axleboxes for the carrying wheels. Above are shown the leading bogie, and incidentally, the R.C. poppet valve mechanism with the cover off, and the trailing wheels with Timken bearings. Below, one of the bogie axles. The other locomotive has Skefko bearings

RAILWAY NEWS SECTION

PERSONAL

Mr. G. Stephen, Vice-President of the Canadian Pacific Railway is at present on a visit to Europe.

Mr. H. H. Sterling LL.B., Chairman of the New Zealand Government Railways Board, has arranged to tour America, Great Britain and various Continental countries, and was to have left New Zealand at the end of April. He will be abroad until the end of the year.

Mr. T. J. Hartigan, Commissioner for Railways, New South Wales, is on a visit to England to inquire into railway matters generally. He will return by way of America.

From the *London Gazette* of May 17:—Regular Army Reserve of Officers, Regimental List, Royal Engineers: Major and Bt. Lt.-Col. F. T. Bowler from Supplementary Reserve of Officers, R.E., Transportation, to be Major and Bt. Lt.-Col., May 1, 1935, retaining his present seniority. Lt.-Col. Bowler is Divisional Engineer, Oswestry, G.W.R.

The King has been pleased to award the Imperial Service Medal to the following:—

Messrs. K. McK. Robertson, C. F. Schmeer, and J. D. Starkey, New South Wales Government Railways; also R. Allen, T. Bartley, H. Inkin, W. Moore and W. Ratcliffe, Tasmanian Government Railways.

We regret to learn of the death, on May 15, of Mr. William Hewart, users' representative on the Irish Railway Wages Board, and for the past 20 years Chairman of the Dublin United Tramways Co. (1896) Ltd.

Mr. Frank Gilbert has been appointed Secretary to the Railway Staff National Council. He formerly held a position in the General Manager's Office at Waterloo, and has been Secretary to the Railways Staff Conference for the past seven years. He is also Joint Secretary of the National Railway Shopmen's Council, the National Railway Electrical Council and the Railway Police Central Conference. Mr. Gilbert also acted as Secretary of the Special Joint Committee which was responsible for the establishment of the new Machinery of Negotiation for Railway Staff.

Mr. M. W. Clement, who, as announced in THE RAILWAY GAZETTE of May 17, has been elected President of the Pennsylvania Railroad, has for the past nine months been acting in that capacity for General Atterbury owing to his indisposition. Mr. Clement is a civil engineer who joined the Engineer's Department of a constituent of the Pennsylvania system 34 years ago, and served in an engineering capacity for 16 years before becoming a Superintendent. With this technical and with a wide range of transportation experience subsequently, he is well equipped to take over the reins of control over the great system of which he is now chief executive officer.

Mr. M. W. Clement,
Elected President of the Pennsylvania Railroad

The Directors of the Emu Bay Railway Co. Ltd. (Tasmania) in their annual report refer with regret—in which we share—to the death of their colleague, Sir John Grice, who had been Chairman of the company since its inception. They also take the opportunity to place on record their appreciation of his very valuable services to the company.

With the approaching completion of the electrification of the Wellington-Raekakariki 25-mile main line and suburban section, the New Zealand Railway Department has created a new position, that of Electrical Traction Engineer, and Mr. A. J. Jeffs has been appointed to fill it.

INDIAN RAILWAY STAFF CHANGES

Rai Bahadur B. R. Singh, Agent, E.B.R., has been permitted to retire from Government service as from March 18.

Mr. A. K. Muirhead has been confirmed as Controller of Stores, N.W.R., with back effect from May 24, 1934.

Mr. S. C. Das Gupta has been appointed Deputy Chief Accounts Officer, Burma Railways, as from March 30, 1935.

Mr. H. C. Wallace, Deputy Chief Mechanical Engineer, E.I.R., has been granted leave for 20 months preparatory to retirement, as from May 1.

Mr. J. Scruby, Officiating Deputy Chief Engineer, N.W.R., has been granted six months' leave, as from April 22.

Mr. R. N. Nicolls, O.B.E., General Manager of the Darjeeling Himalayan Railway, has proceeded to England on leave for six months, and Mr. R. N. Kirby, Locomotive Superintendent, has been appointed to act as General Manager during his absence.

Under the administrative reorganisation scheme on the M. & S.M.R., the following appointments are announced:—

Mr. C. G. W. Cordon, to be Chief Commercial Manager;

Mr. R. E. Nunn, to be Deputy Chief Commercial Manager;

Mr. R. De K. Maynard, to be Chief Operating Superintendent.

Mr. A. W. Barrett, Assistant Chief Commercial Manager (Claims) L.M.S.R., news of whose sudden death we received in time for publication only in our news columns last week, entered the service of the former L.N.W.R. at Broad Street in 1898, and in the following year was transferred to the Assistant Goods Manager's Department at Euston. In January, 1914, he was transferred to the General Manager's Department. From 1916 to 1919 he served with H.M. Forces in France under the Director-General of Transportation. From September, 1919, to June, 1920, Mr. Barrett was associated with Sir George Beharrell at the Ministry of Transport, and then rejoined the late

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L.N.W.R. and was engaged on Parliamentary matters until, in 1921, he was appointed head of the Rates Section of the Chief Goods Manager's office. Two years later he was appointed Chief Rates Assistant to the Chief Goods Manager, L.M.S.R., and held this position until 1925, when he was appointed

The late Mr. A. W. Barrett,
Assistant Chief Commercial Manager (Claims), L.M.S.R., 1933–35

Commercial Assistant to the Goods Commercial Manager. In May, 1927, he became Continental Traffic Manager, but in December of that year his designation was changed to Overseas and Continental Traffic Manager. It was in January, 1933, that Mr. Barrett was appointed Assistant Chief Commercial Manager (Claims), the position he still held at the time of his untimely death at the age of 51. The funeral took place at 2.30 p.m. on Monday last at St. Ninian's Church, Golders Green. In addition to family mourners and friends, there were among those present:—

L.M.S.R.: Messrs. W. V. Wood (Vice-President); C. R. Byrom (Chief Operating Manager); T. E. Argile (Assistant Chief Commercial Manager, also representing Mr. Ashton Davies, Chief Commercial Manager); G. Morton (representing Mr. E. Taylor, Chief Accountant); G. L. Smythe (representing Mr. Alexander Eddy, Solicitor); A. W. Norman (Assistant Chief Stores Superintendent, also representing Mr. S. J. Symes, Chief Stores Superintendent); F. B. Halliwell (representing Captain Harris, Chief Marine Superintendent); C. N. Mansfield (Assistant Chief Commercial Manager, Coal); T. W. Dunn (Chief of Police); W. P. Bradbury (Assistant to Chief Commercial Manager, also representing Mr. T. W. Royle, Chief Assistant Commercial Manager); H. B. Webster (Rates and Charges Assistant to Chief Commercial Manager, also representing Mr. D. C. McCulloch, Assistant to Chief Commercial Manager); H. E. Horne (Assistant to Chief Commercial Manager); Col. K. R. N. Speir, D.S.O. (Continental and Overseas Assistant to Chief Commercial Manager); T. A. Moffet (Sales Assistant to Chief Commercial Manager); T. Firth (Assistant Staff Superintendent); E. S. Hunt (Assistant to Chief Operating Manager); C. H. Carter (Parliamentary Assistant); A. L. Castleman (District Goods Manager, Broad Street); F. R. Hauxwell (District Goods Manager, Liverpool); C. Johnstone (District Passenger Manager, Liverpool); E. G. Garstang (Manager, Goole Steam Shipping). Retired Officers of the L.M.S.R. were represented by Mr. John Quirey (late Vice-President) and others.

Other Railways: Messrs. A. Maynard (Chief Goods Manager, G.W.R.); C. H. Crewe (representing Mr. A. L. Gibson, Continental Traffic Manager, L.N.E.R.); C. Cooper (Continental Assistant to the Traffic Manager, Southern Railway); W. J. Wells (representing Mr. E. C. Cox, Traffic Manager, Southern Railway); E. E. Painter for Secretary, Railway Clearing House); A. F. Keen (representing Mr. H. M. Gibson, General Manager, Manchester Ship Canal).

Consequent upon the death, on March 30, of Mr. Herbert Allen, Vice-Chairman of the Costa Rica Railway, Mr. F. J. Oliver, the Secretary of the company, has been appointed to a seat on the board of directors and elected Managing Director in place of Mr. A. J. Shepherd, who has resigned the managing directorship but retains his seat on the board. Mr. T. C. B. Williams has succeeded Mr. Oliver as Secretary of the company. Earlier in the year also, Mr. R. P. W. Adeane resigned from the board owing to pressure of business, and Mr. H. C. Drayton took his place.

The late Mr. Herbert Allen was for many years Editor and chief Proprietor of *The Railway Times* (one of the papers now incorporated in THE RAILWAY GAZETTE), but resigned this office in February, 1905, when control of the paper was purchased by the interests owning the *Tramway and Railway World* (now *The Transport World*), under whose auspices it was published until its incorporation in THE RAILWAY GAZETTE in April, 1914.

We regret to record the death, on May 19, of Mr. T. E. Shaw, better known as Col. T. E. Lawrence or "Lawrence of Arabia." Though he had no peace-time connection with railways, it was—as referred to in an editorial note on page 1013—his remarkable efficiency in the destruction of them in time of war that brought him much of his fame and prestige among the Arabs.

We regret to record the death, on May 14, of Mr. S. Gearing, District Locomotive Superintendent, Lincoln, L.N.E.R.

INTER-RAILWAY AMBULANCE COMPETITION.—The annual final contest for the possession of the Inter-Railway challenge trophy of the St. John Ambulance Association between representative teams of the British railways will be held at the Wharncliffe Rooms, London, W.1, on May 24, at 10.0 a.m. Each of the four main line railways will be represented by two teams, and the ungrouped railways by one team, as follow: G.W.R., Small Heath and Fishguard Harbour; L.M.S.R., Agecroft and Bushbury; L.N.E.R., Tyne Dock and Dukinfield works; Southern Railway, Waterloo A and Horsham No. 1; ungrouped railways, Midland & Great Northern Joint Railway. The team to represent the ungrouped railways was selected at a preliminary competition held at the Headquarters of the St. John Ambulance Association on March 29 last, when Dr. R. B. Duncan of London was adjudicator, and the result was: Midland & Great Northern Joint, 256 marks; Southern & L.M.S. Joint (Somerset & Dorset), 232; Metropolitan Line, L.P.T.B., 222; and Cheshire Lines Committee, 201. The presentation of the Challenge Shield and prizes today will be made by Sir Robert Horne.

The late King Feisal of Iraq and Col. T. E. Lawrence, leaving the offices of the North British Locomotive Co. Ltd., Glasgow, on December 16, 1918

The Crewe Dinner

The 45th annual dinner of the past and present Crewe Pupils and Premiums was held on May 17 at the Trocadero Restaurant, London, W.1. Those present included:—

Messrs. F. W. Abraham; R. D. Ball; F. N. Bayley; Capt. H. P. M. Beames; Messrs. G. H. P. Beames; F. S. Bennett; D. H. Binyon; R. C. Bond; A. F. Bound; R. Brocklebank; T. P. Brome-Giles; R. D. Browning; O. Bulleid; V. R. Bowen-Cooke; Col. E. V. Collier; Col. F. R. Collins; Messrs. W. S. Cooke; R. B. Creak; Major R. D. K. Curling; Messrs. G. R. S. Darroch; F. Davy; Lieut.-Col. J. V. Denning; Messrs. A. Devon; I. F. L. Elliott; N. F. Eiloart; C. A. J. Elphinston; Lieut.-Col. C. J. H. W. Francis; Messrs. R. Fell-Clark; W. S. Fraser; A. S. Gillett; J. N. Gresham; S. T. Gresham; H. N. Gresley, C.B.E.; W. Handy; Sir Martin Hall; Major H. A. Harrison; Mr. F. B. Henry; Capt. C. C. Horne; Messrs. Reginald Horton; W. Howard Williams; Geo. Hughes; A. P. Hunter; Clement James; A. H. Judd; Chas. S. Lake; W. B. Leach; G. A. Lemon; Prof. G. V. Lomonossoff; Messrs. Geo. Lomonossoff; R. C. S. Low; R. C. Mace; C. L. Mason; W. E. K. Mayne; B. C. McPherson; N. A. Merriman; Lieut. D. W. S. Miller; Messrs. L. A. Mohan; G. Mossley; H. G. Neal; W. E. Pickering; F. D. Playford; F. A. Pope; T. N. Price; D. C. L. Reynolds; R. A. Riddles; D. G. Ritson; Capt. E. A. Robinson; Messrs. H. Robinson; W. A. Ross; L. W. Robertson; R. O. Sampson; J. G. B. Sams; J. Shearman; Col. C. K. D. Sidgwick; Messrs. W. A. Stanier; V. C. Stockton; Lieut.-Col. G. S. Szlumper; Major R. Tandy; Messrs. T. Tandy; J. Kenneth Taylor; George Terrell; Glynn G. Terrell; Capt. Reginald Terrell; Messrs. R. F. Tucker; R. E. Trevethick; E. A. W. Turbett; D. C. Urie; M. N. Varvill; Sir Herbert Walker, K.C.B.; Messrs. C. E. Ward; W. L. Watson; A. Webb; Major C. E. Williams; Messrs. Cyril W. Williams; R. H. Williams; R. S. Wood; J. M. D. Wrench.

Mr. F. S. Bennett occupied the chair and, in proposing the loyal toast, included also the name of The Queen, and the company sang the National Anthem to mark the Jubilee year of Their Majesties' reign.

Lieut.-Col. Gilbert S. Szlumper, C.B.E., Assistant General Manager, Southern Railway, proposed the toast of "Past and Present Crewe Pupils and Premiums" in a characteristically humorous speech. Major R. D. K. Curling, M.C., replying, referred to his early days at Crewe and expressed the opinion that an engineer could have no finer training than that provided there. He included in his remarks appreciative reference to the work of Capt. Reginald Terrell, the Honorary Secretary, in the organisation of the annual Crewe dinner.

Mr. F. S. Bennett proposed the toast of "The Guests." Looking round the gathering he jocularly described his own years at Crewe as the gay '90's, which he said certainly appeared to have been vintage years. The transport of the world was to a large extent, he said, in the hands of Crewe men. He never regretted the fact that Crewe was his only public school. From his own experience, he advised the younger men present, if they saw a new and promising industry starting up, to get into it. There was nothing more fascinating than seeing things built up. He welcomed their guests, mentioning by name Mr. Howard-Williams, Sir Herbert Walker, Lt.-Col. F. J. H. W. Francis, Lt.-Col. G. S. Szlumper, and Capt. I. F. L. Elliott.

Mr. W. Howard-Williams, C.B.E., Chairman, Central Argentine Railway, responding, said he valued the opportunity of once again meeting old friends and being in the atmosphere of men from Crewe. He was privileged to receive the hospitality of railwaymen in many different parts of the world and gave instances of his meetings during visits to South America with Crewe men and railwaymen from the former London & North Western Railway system and other British railways, often made in strange and far-away places. He emphasised to those present that men in the transport industry, both in this country and abroad, were all members of one big brotherhood, and he expressed the belief that the younger generation, given their opportunity, would maintain the great traditions of Crewe.

Mr. J. Shearman proposed the toast of "The Chairman" and spoke of the high position attained by Mr. Bennett in the motor engineering industry and of the pioneer work he had done in developing the principles of standardisation in engineering. He was the first also, Mr. Shearman said, to introduce to this country a car with electric lighting and electric self-starting equipment. Mr. Bennett in reply spoke of his own personal experiences in the engineering world and described how he had devised and pursued a definite plan in life for himself, and as a result of his own success was enabled to assist others less fortunate. Speeches were called for from and characteristically delivered by Capt. Reginald Terrell and his father, Mr. George Terrell, before the proceedings terminated.

Northern Ireland Transport

The Northern Ireland Road and Railway Transport Bill for the co-ordination of road and rail traffic and to pool the receipts, was submitted for second reading in the Northern House of Commons on May 15. Great interest was taken in the reading, and among those in the public galleries were Sir Lingard Goulding, Chairman, and Mr. J. B. Stephens, General Manager, G.N.R. (I.); Mr. T. Richardson, Chairman, and Mr. W. F. Minnis, General Manager, B. & C.D.R.; and Major Malcolm Speir, Manager, L.M.S.R. (N.C.C.).

In introducing the measure, Sir Dawson Bates, Minister for Home Affairs, said that there could be no doubt that road transport had introduced great advantages and conveniences, and no thinking railwayman would contest the fact that some existing branch railways were now useless owing to the advent of road transport, and that therefore certain lines must be closed. The transport industry, he continued, was as a whole being conducted uneconomically and wastefully, and was to a large extent living upon its capital. This state of affairs could have but one end, which would mean the collapse of transport services, and it was the duty of Government to prevent such a catastrophe. Sir Dawson Bates refuted the contention that the Bill was being brought forward in the interests of the railway shareholders. On the contrary, he pointed out, it was essential that something should be done at once to salve the industry as a whole.

The stoppage of the railways would throw upon the roads an enormous volume of traffic not hitherto carried by them, and road freight transport was at present badly organised, wasteful and financially unsound. If such a situation were to be allowed to continue, it would provide an ideal opportunity for the unscrupulous to exploit the community.

After referring to the losses incurred by the various railway systems, he pointed out that none but the Northern Counties Committee had any English railway to support it, and consequently when its reserves were exhausted it would have to go out of business.

Though pressed to follow the policy adopted by the Free State, the Northern Government had decided to reject the proposal for the acquisition of road transport undertakings by the railways, as it considered that the function of road transport should be much wider than merely as an adjunct to the railways. Consequently it was proposed to establish a road transport board to take over all road transport, whether belonging to the railway companies or to private concerns. This board would be responsible for adequate passenger and goods services by road, and the net receipts of the transport board and the railways would be pooled and divided in accordance with the receipts of a standard year. The appeal tribunal was also part of the Government scheme to ensure adequate protection for the public, and would include the functions of the Railway and Canal Commission and also of the existing Rates and Fares Tribunal.

There was a considerable amount of discussion during the three days' debate on the measure, and the criticisms were mainly non-constructive. The ideas of monopoly and of the Bill being chiefly intended to bolster up the railways were constantly repeated, but the Prime Minister emphatically contradicted this. Some ten or twelve years ago the Cabinet was deeply concerned at the prospects of the railways and traffic generally, and approached the railways to ask them to indicate what could be done to alter the position. The Prime Minister also set up a departmental committee some years ago for the information of the Cabinet, and the information obtained then and at the present time showed that the position was much more serious than some members appeared to realise. The second reading was carried on May 16 by 26 votes to four.

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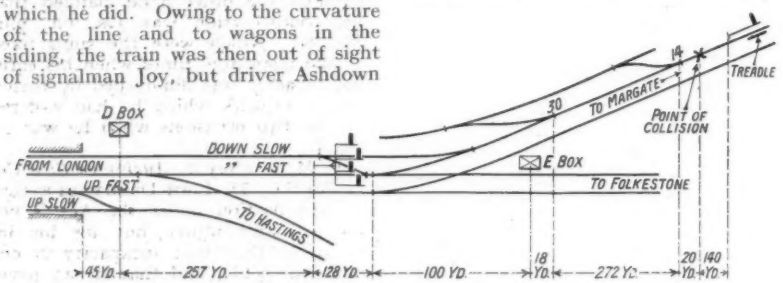
MINISTRY OF TRANSPORT ACCIDENT REPORT

Ashford (Kent), Southern Railway: September 1, 1934

In this case a freight train from the Hastings direction ran through the station on the up slow line and was there crossed on to the down slow line and propelled on to the branch to Margate, coming to rest with the engine standing clear of No. 30 points and ready to enter the down sidings at that spot. Yard Inspector Whittaker told the driver, however, to move forward to No. 14 points, which he did. Owing to the curvature of the line and to wagons in the siding, the train was then out of sight of signalman Joy, but driver Ashdown whistled when he again came to a stand and Joy admitted that he heard the whistle.



Sketch plan showing point of collision outside Ashford station

Signalman Joy afterwards had to deal with two separate light engines, and had some conversation with a shunter over the telephone; and when, 10 minutes after the freight train had come to a stand, he was offered a passenger train, he overlooked the standing train, accepted the other train and lowered his signals for it. In the consequent collision, the driver of the passenger train was so seriously hurt that Colonel Trench, who inquired into the accident, could not hear his evidence until November 30.

As the line is protected by Sykes lock-and-block the signalman should not have been able to accept the passenger train and it was obvious that in order to do so he must have used the releasing key. Although Joy told Colonel Trench that he had no recollection of using it, he agreed that he was constantly doing so, and it would in fact have been a necessary and proper procedure for him to use this key as soon as the freight train had been shunted clear of the running line. The necessity for the use of the release key should, the report observes, be a reminder to a signalman to satisfy himself that its use is justifiable and correct in the circumstances before he uses it. He suggested that the apparatus might have failed, and this is a possibility, but the failure must in that case have been of an intermittent type as it was tested immediately after and found in order. In the circumstances Colonel Trench feels little doubt that he did use the release key. Apart from the protection afforded by the lock-and-block system, Joy should have placed a lever collar on the down branch home signal to remind him that this must not be pulled until the freight train was removed. It would appear that he was working under circumstances of considerable pressure at the time.

A share of the responsibility must also be attributed to yard inspector Whittaker, in that he left the train standing on the line for an unnecessary period. The only deduction to be drawn from his statements is that he forgot the train in his anxiety to clear another train from the down main line. He suggested that Joy could have allowed the freight train to enter the sidings as soon as he saw that the siding was clear, but under normal conditions the signalman would have no business to admit the train into the sidings without the instructions or concurrence of the yard staff, who might well be making a conflicting move without his knowledge.

Driver Ashdown neglected to comply with rule 55 by not sending his fireman to the box to remind the signalman of the presence of his train on the running line. His explanation was that the existence of the diamond sign on the starting signal, immediately adjacent to the brake van of his train, led him to understand that he was in a position in which he was exempted from carrying out rule 55. He agreed that he was not standing at this starting signal, nor was it applicable to the movement he was making. The rule in question, however, concludes thus:—"The provisions of clauses (*a*) to (*f*), inclusive, of this Rule must, however, be observed in connection with all shunting movements." From this it is quite clear that the exemption from rule 55 did not apply to this shunting movement, and that Ashdown should have sent his fireman to the signal-box.

It was clear, however, that, even several days after the accident, Ashdown was entirely confident that his inaction in this respect was in accordance with the rules, and that he did not appreciate the importance of the last sentence which withholds exemption in the case of shunting movements. Some explanation of this view may be attributed to an incorrect assumption that the diamond sign necessarily implied the existence of a track circuit, in which case the presence of his train would have actuated the protective apparatus—as was indeed the case with the protective apparatus of the lock-and-block—but the release of a track circuit lock would have been a much more serious matter than the use of the lock-and-block release key, and would certainly have caused a signalman to think twice before taking action.

In view of what appeared to be the genuine misunderstanding of driver Ashdown as to the meaning and effect of the diamond sign, Colonel Trench suggests that the company might consider whether this point should not be again brought to the notice of all drivers, although it must be admitted that the wording of the rule is quite clear.

The Rodent Menace on Railways

Although the pitch has not yet been reached when railway balance sheets include a separate heading for depreciation caused by the activities of rats and mice, it has already been made compulsory by Act of Parliament to keep premises free from such vermin. This responsibility is fully appreciated by the railway companies, upon whom devolves the task not only of safeguarding their own property but that of others which is constantly passing through their hands.

A new preparation for exterminating rodent pests has been produced after lengthy experiment by W. Edmonds & Co. Ltd., research and manufacturing chemists, of 14-15, Bradley's Buildings, White Lion Street, N.1, and has been adopted by certain British railway companies. Although having the property of infecting rats and mice with a contagious disease, it is harmless to human beings, animals, and birds. Where vermin have already gained a strong hold, the firm arranges for extermination to be carried out by a staff of experts whose services are available day and night.

The very real danger of the vermin menace is better appreciated when it is realised that over a four-year period one pair of rats may increase to nearly eleven million. The danger of disease in such cases is serious enough, but must not be allowed to obscure the possibilities of fire created by the rodents gnawing through electrical insulation. Speed is evidently an important factor in attacking a problem capable of growing to such proportions in so short a time, particularly when a large amount of valuable property open to attack multiplies the chance of serious loss. It has been calculated that this country has a rodent population of 132,000,000, capable of doing £134,000,000 worth of damage a year.

THE MONTH'S RAILWAY LAW

L.N.E.R. Assessment

In deciding to enter the assessment of the London & North Eastern Railway Company in the draft valuation roll as "nil" the Railway Assessment Authority has purported to follow the principles laid down for its guidance in the Southern Railway Company's case. Taking the average net receipts for 1928 and 1929 as £10,904,000 and the net annual value as £3,500,000, it proceeds to deduct £10,250,000 the percentage on the tenant's capital (15 per cent.). When a share of receipts earned without the use of the tenant's chattels is added to this and deducted, the whole of the net receipts disappears and the result is "nil."

This is obviously a *reductio ad absurdum* of the Railway & Canal Commission's judgment, and will involve appeals by the various county councils concerned, who see their rates roll seriously reduced. The net annual value of the railway companies' undertaking must be appreciable, although the previous figure of £3,500,000 in the North Eastern case was presumably too high.

It is clear that appeals under the Railways (Valuation for Rating) Act, 1930, will be lengthy and numerous in view of the difficulties of interpretation and administration. The chief interest at present centres round the appeal to the House of Lords in the Southern Railway Company's case.

Assessment of Station Premises

Re the Southern Railway Company's Assessment. (*The Times*, April 16.)

The chief point in this case was whether premises such as tobacco shops, bookstalls, and offices, rented out at Victoria station, should be included in the assessment of the company or should be separately rated by the City Council under the Railways (Valuation for Rating) Act 1930. The Westminster City Council as the rating authority for that city appealed against their inclusion as part of the railway hereditaments on the ground that they were "so let out as to be capable of separate assessment" within the Rating and Valuation (Apportionment) Act 1928 S. 6, subs. 3, proviso (a). Their contention was that these premises were let on separate agreements, and were not occupied for the purposes of the railway undertaking.

The railway company claimed that they were rightly included in the roll, their situation forming part of railway hereditaments within the Railways (Valuation for Rating) Act 1930. The Railway Assessment Authority had decided against the railway company, and there was an appeal upon this and kindred questions to the Railway & Canal Commission. Mr. Justice MacKinnon in his judgment said that on the terms of the agreements with the tenants of the shops the company had parted with exclusive occupation. As regards some of the premises described as "show-cases," these were small rooms used to display goods for advertisement: and he thought that these were in the exclusive occupation of the tenants.

But in *Smith* v. *Lambeth Assessment Committee* (10 Q.B.D. 328) it was held that bookstalls at Waterloo were in the occupation of the railway company and not of Messrs. W. H. Smith. Mr. Justice MacKinnon with some reluctance felt he must follow that decision and dismiss the appeal of the Westminster City Council as to Messrs. Smiths' bookstall in the present case. As regards the other shop premises, it was impossible to discriminate and as to these also the same result must follow.

The second part of the appeal concerned offices of the railway company conected with the rating roll as being "hereditaments." The company contended that they were "freight transport hereditaments" within the meaning of the Act of 1928, S. 5, sub-s. 1, clause a, par. 1 and sub-s. 2 (a). The Assessment Authority had held that these offices were primarily used as offices for the "general direction and management of the railway." The Railway & Canal Commission here agreed that the offices were quite distinct from the purpose of a "railway station" just as the station hotel was distinct, and it dismissed the company's appeal.

Finally, the railway company appealed as to the assessment of its high tension cables and electrical substations. The question was whether they were "hereditaments consisting of land used only as a railway made under the powers of any Act of Parliament." Was the land in question "used only as a railway?" It was apparently agreed that the cables were "hereditaments consisting of land." The electric railway could not be worked without the electric current, and current could not be applied without high tension cables and substations.

Following *Lancashire & Yorkshire Railway Co.* v. *Liverpool Corporation* (1915) A.C. 152, the Railway and Canal Commission held that the cables and sub-stations were "hereditaments consisting of land used only as a railway." On this point therefore the appeal of the railway company was allowed.

A Workman's Second Accident

Thompson v. *London & North Eastern Railway Company*, 1935 W.N. 67.

In 1921, Thompson was employed by the company as a smelter at a wage of £4 4s. 9d. a week. In that year he met with an accident to his finger which totally disabled him for some time, and was paid compensation for a period of three months. He then returned to the service of the company as a labourer at a wage of 40s. 6d. a week and 19s. 6d. compensation for loss of earning capacity owing to his accident. On February 21, 1934 he met with a second accident, upon which compensation according to scale would be 22s. 7d. a week. The railway company claimed that as he was already receiving 19s. 6d. a week in respect of his first accident, they were under no liability to pay him 19s. 6d. plus 22s. 7d. in respect of the second accident. The Workmen's Compensation Act 1925, s. 9 subs, 1 (*i*) expressly provides that the weekly payment shall in no case exceed 30s., and the railway company argued that this was the limit of its liability. The workman on the other hand claimed that his compensation was 19s. 6d. plus 22s. 6d., which were the sums fixed at the respective times when his earning capacity was diminished by reason of the injuries which he had suffered on the two occasions when he was injured.

In *McKinstrey* v. *Auchinlea Coal Co.* (1920) S.C. 75, Lord Dundas says that "compensation under the Act is not for a man's injury, but for his incapacity, that that incapacity is one and indivisible, and that it can never be more than total incapacity however many injuries by accident a man may have suffered." Relying on this the County Court Judge found in favour of the railway company. The Court of Appeal disagreed with this view, as being inconsistent with *Harwood* v. *Wyken Colliery Co.* (1913) 2 K.B. 158 and *Hodgson* v. *West Stanley Colliery Co.* (1910) A.C. 229. The Lord Justices thought they were not entitled to cut down the two sums payable to the workman unless expressly directed to do so by statute. It appears therefore that the limit of 30s. a week laid down in the proviso to Section 9 of the Act does not apply where a workman is entitled to two amounts of compensation as the result of two accidents.

L.P.T.B. as a Public Authority

The Public Authorities Protection Act requires that actions for damages against a public authority must be commenced within six months of the accident.

The position of the London Passenger Transport Board in this connection does not appear to be clearly defined. But in an action in the Ilford County Court it has been recently held that the board is entitled to claim the protection of the Act. The point will certainly go to a higher court for decision. The argument against this view is that the board, which merely took over and controls the various companies previously engaged in London Passenger Transport, is still engaged in trading for a profit, and that the Act is only directed to state and municipal bodies. It is difficult to define the status of bodies of this kind which bear characteristics of both public and trading concerns. But the Metropolitan Water Board is a body composed in a similar way to the Transport Board and the former has been already held to be a public authority.

XUM

The Institute of Transport Visit to Austria

On Saturday last, May 18, a party of about a hundred left London by the 4.30 p.m. Continental express from Victoria to take part in the Institute of Transport visit to Austria. Mr. Sidney E. Garcke, President of the Institute, who was accompanied by Mrs. Garcke, headed the party, which included :—

Arthurton, A. W., formerly Secretary, British Railways Press Bureau; Barnett, R. W. G., Director, Liverpool Cartage Co., Ltd.; Bartley, F. D., C.B.E., Deputy Commissioner of Police in charge of Traffic, Calcutta; Bocquet, G. S., C.I.E., V.D., Traffic Manager, Eastern Bengal Railway; Brant, E. D., Railway Research Service; Brinkworth, W., Southern Railway; Brooke-Hitching, Lt.-Col. P. M.; Cannon, A. E., General Manager, Southdown Motor Services, Limited; Carter, F. W., Director, Carter, Paterson & Co. Ltd.; Curtis, W. S., L.N.E.R. (Consett); Daniels, A. V., L.N.E.R. (Newcastle-on-Tyne); David, T. W., G.W.R. (Cardiff Docks); Day, J. T. (A.M.), Divisional Transportation Superintendent, Great Indian Peninsula Railway; Endean, W. F., General Manager, Gateshead & District Tramways Company; Follows, J. H., C.V.O., C.B.E., formerly Vice-President, L.M.S.R.; Ford, E., O.B.E., formerly Chief Goods Manager, G.W.R.; Garcke, Kenneth; Griffiths, J. C., M.C., Transport Manager, J. Lyons & Co. Ltd.; Hassall, E. B., formerly Assistant to Vice-President, L.M.S.R.; Hayter, Major G. W., O.B.E., Chief Engineer, Northern General Transport Co. Ltd.; Homer, T. Graham, General Manager, Thames Valley Traction Co. Ltd.; Johnson, R. W., M.C., formerly Traffic Superintendent, Singapore Harbour Board; Joll, R. R., Southern Railway (Waterloo Station); Jones, J. F. A., formerly Accountant (North Staffordshire Section), L.M.S.R.; Kay, J. A., Editor, THE RAILWAY GAZETTE; King, C. F., Bryant & May Limited; Kirkus, A. E., O.B.E., Director of Statistics, Ministry of Transport; Leaver, K. W., Representative of London Office, Austrian Federal Railways; McDonnell, J., Assistant General Manager; Birmingham Corporation Tramways and Omnibus Department; Marshall, J., Director and Manager, Lloyd's Packing Warehouses Limited, Manchester; Merriweather, J. G., General Superintendent, Port of Preston; Mitchell, J. W., Transport Superintendent, Carr & Co. Ltd.; Moscrip, H. J., M.B.E., formerly Assistant General Manager, Tyne Improvement Commission, Newcastle-on-Tyne; Murfitt, C. J., Engineer, East Kent Road Car Co. Ltd.; O'Leary, J., Great Southern Railways of Ireland; Oram, G., Cardiff Corporation Transport Department; Osborne, L. J., L.N.E.R. (Rugby); Palser, A. R., London Passenger Transport Board; Paterson, R., Sudan Railways; Pegrum, J. W. S., Rhodesia Railways; Pike, J., O.B.E., formerly Goods Commercial Manager, L.M.S.R.; Richards, E. A., Chief of Train Control (Southern Section), Buenos Ayres Great Southern Railway; Ritchie, E. A., Belfast Corporation Tramways; Sinnott, Col. E. S., C.M.G., formerly County Surveyor of Gloucestershire; Smith, A. Witcombe, General Manager, West Bromwich Corporation Transport Department; Stagg, H. A., Resident Director and Secretary, Northern General Transport Co. Ltd.; Tatlow, A., formerly New Works Assistant to Chief General Superintendent, L.M.S.R.; Thomas, T. E. (Vice-President), General Manager, Tramways) London Passenger Transport Board; Town, S. Mallyon, Superintendent of Fiscalisation, Rio de Janeiro Tramway, Light & Power Co. Ltd.; Vigor, S. R., Carter, Paterson & Co. Ltd.; Waddell, T. F., Carter, Paterson & Co. Ltd.; Gray, A. Winter, Secretary, The Institute of Transport; Crews, Frank, Assistant to the Secretary.

The party travelled via Folkestone, Boulogne, Laon, Strasburg, and Basle to Buchs, where it was met by Herr Ing. Karner, the Chief Mechanical Engineer of the Austrian Federal Railways, and by Herr Ing. Dobrawsky, the Divisional Superintendent at Innsbruck, and Herr Frederic Strauss. At Buchs the party transferred to a special train which had thoughtfully been placed at its disposal by the Austrian Railways Administration; it comprised four coaches, a restaurant car, and an open observation car, and was hauled by two electric locomotives. The journey from Buchs to Innsbruck by the world-famous Arlberg route was one long delight. With mighty snow-capped mountains on each side, the train climbed steadily, ever twisting and turning, to the Arlberg tunnel, nearly seven miles long. Before arriving at the tunnel the train had entered a snow-covered area, and the great stretch of snow from the rail-track to the top of the mountains, interrupted only by the hoary-looking trees, presented an enchanting scene.

As the party alighted at Innsbruck, it was greeted by the strains of the British National Anthem played by the band of the local railway musical organisation. The open space outside the station it found busy with the marchings of members of the Heimwehr, who were that day celebrating at Innsbruck the fifteenth anniversary of the foundation of their organisation.

After lunch a visit was made to Igls by motor coach, and in the evening, before dinner, Herr Ing. Karner received the members of the party at the Hotel Tyrol and extended to them an official welcome on behalf of the Austrian Federal Railways. He said that they considered it a special honour that the Institute of Transport decided to hold this year's Congress in Austria. With a total length of 5,814 km., the Federal Railways formed an important link of European through traffic. Excepting one, all international express trains or *trains de luxe* going to south-east Europe ran through Austria. The country was mainly mountainous and therefore not only were the constructional costs higher at the outset, but a higher permanent scale of revenue expenditure was necessitated for the maintenance of the road, for coal, &c. The best example of one of their alpine main lines was the Arlberg line. The eastern section, from Landeck to St. Anton, had a gradient of 1 in 39 on a length of 28 km., and the western section, from Langen to Bludenz, had a gradient of 1 in 33 over a total length of 25 km. After the war, due to the lack of suitable locomotive coal, main-line electrification was started on a large scale; 918 km. were at present electrified. The sections comprised, beside others, all the main lines in the west of Salzburg; for these three running sheds were built, the largest of which was Innsbruck.

The locomotive and railcar stock comprised on April 1 last 2,341 units, of which 2,040 were steam locomotives, 216 electric locomotives, 27 electric railcars, and 56 internal-combustion engined railcars, as well as two steam railcars. Hand in hand with the modernization of the rolling stock the workshop service was re-organised. While in 1924 repairs to rolling stock were carried out in fourteen workshops, nine workshops were closed down following the introduction of up-to-date working methods and a far-reaching specialisation of the work. The electrification of the western main lines made necessary the arrangement of a repair shop at Linz for electric locomotives.

Mr. Garcke, the President of the Institute, replied in a brief but most happily-phrased speech. After expressing thanks to Herr Karner for his words of welcome, he referred to the engineering difficulties which the men of Austria had had to face, and to the manner in which they had overcome them. The journey of the morning had been an experience which they would not easily forget, both on account of the engineering wonders it had shown them and of the beautiful scenery. Mr. Garcke, continuing, said that he was confident that Austria was overcoming its recent difficulties with the same spirit and courage which had been manifested in its "fight with the mountains," and wished it prosperity and success in the future.

Monday, May 20, was devoted to a sight-seeing tour of Innsbruck and to ascents, by cable-suspension railway, of the Patscherkofel and Hafelekar. At 5.30 p.m., the members of the party were received at the Hofburg by the Governor of the Tyrol and the Burgomaster of Innsbruck. On the Tuesday, a visit was made to the Innsbruck traction workshop before departing for Salzburg.

C.N.R. LONDON OFFICES.—The city traffic office of the Canadian National Railways moved to modern ground floor premises at 95, Leadenhall Street, London, E.C.3, on Tuesday last, May 21. Mr. E. A. Novis, City Agent of the company, is in charge as heretofore.

UNITED RAILWAYS OF THE HAVANA.—Meetings of the holders of debentures and debenture stocks of the United Railways of the Havana & Regla Warehouses Limited were held on May 20 to consider a further scheme of arrangement. The scheme of June 27, 1930, had for its principal object the postponement of the payment of interest on the company's debenture capital. The operation of this scheme was by a further scheme of June, 1932, extended for a period of two years, and in exercise of the power granted by the 1932 scheme the stockholders committee approved a further extension which will expire on dates varying from July 1 to October 1, 1935. Under the new scheme which was approved by the meetings the moratorium is to be extended by two years and power is given to the stockholders' committee to agree to an extension of one further year.

NOTES AND NEWS

L.M.S.R. Railcar Success.—The Leyland diesel railcar service over the Darwen-Blackburn-Clitheroe line has been doubled by the addition of a second car, and an entirely new timetable is in operation.

Railway Assessments.—The Railway Assessment Authority has decided not to complete the valuation rolls of the London Midland & Scottish and the Great Western Railway Companies, respectively, until after the hearing of the appeal to the House of Lords in the Southern Railway case.

Railway Liability on Excursion and Workmen's Tickets.—The railway companies have, according to *The Times*, promised to give sympathetic consideration to representations made by the General Council of the Trades Union Congress with regard to the limit of liability in respect of injuries to passengers holding cheap tickets and workmen's tickets.

Bekonscot Model Village and Railway.—This fascinating model community, including now a system of docks, is again on exhibition at Warwick Road, Beaconsfield (three minutes from the station), every Sunday and on the first Saturday in each month from 2 to 7 p.m. The village is open every afternoon, but no trains are run on the model railway then. The price of admission is 1s. (children 6d.), and the proceeds go to the funds of the Railway Benevolent Institution and other charities.

Road Accidents.—The Ministry of Transport return for the week ended May 18 of persons killed or injured in road accidents is as follows. The figures in brackets are those for the corresponding week of last year:—

	Killed, including deaths resulting from previous accidents	Injured
England...	... 96 (109)	3,451 (4,296)
Wales ...	... 3 (5)	138 (176)
Scotland...	... 13 (13)	373 (362)
	112 (127)	3,962 (4,834)

The total fatalities for the previous week were 132, as compared with 128 for the corresponding period of last year.

Railway Staff National Council.—The first meeting was held in London on May 21 of the Railway Staff National Council, established under the agreement of February 26, 1935, between the four group railway companies and the three railway unions. Mr. Kenelm Kerr, L.N.E.R., presided, and the other railway representatives were Messrs. H. H. Halliday, L.N.E.R.; J. F. Lean and H. Adams-Clarke, G.W.R.; G. L. Darbyshire and W. E. C. Lazenby, L.M.S.R.; and O. Cromwell and T. A. Rush, Southern Railway. The N.U.R. was represented by Messrs. J. Marchbank, J. Henderson, J. Barker, and W. Wilcock; the A.S.L.E.F. by Messrs. J. Bromley and A. A. Nisbet; and the R.C.A. by Messrs. A. G. Walkden and F. B. Simpson. Mr. Frank Gilbert was unanimously appointed Secretary to the Council.

Railway Air Services Innovation.—The R.A.S. and Spartan Air Lines joint summer service from Heston to the Isle of Wight, which was resumed on May 1, will include direct trips to and from Sandown air port and from June 1, in addition, to the Bembridge and Cowes services.

Films on Express Trains.—The L.N.E.R. is co-operating with Pathé Pictures Limited and Pathé Equipment Limited in providing a cinematograph van, fully equipped for exhibiting sound films. This is being introduced on Monday, June 3, as a regular feature on certain London-Leeds expresses.

Progress of Railway Bills.—The Southern Railway Bill and the London & North Eastern Railway Bill were reported with amendments to the House of Commons on May 16 by the Unopposed Bills Committee. The London Midland & Scottish Railway Bill, which has already been through the House of Commons, was read a second time in the House of Lords on May 9 and committed.

Yorkshire Woollen District Transport Company.—On May 9 the name of the Yorkshire (Woollen District) Electric Tramways Limited was changed to the Yorkshire Woollen District Transport Co. Ltd. The L.M.S.R. and L.N.E.R. have been shareholders since December, 1929, and have rail and road co-ordination agreements with the company, which operates about 200 buses in the Dewsbury neighbourhood.

Channel Tunnel Company.—Baron Emile B. d'Erlanger, presiding at the ordinary general meeting of the Channel Tunnel Company on May 14, said they were marking time whilst paying their way. He remained convinced that the day would come when a tunnel would be built to connect this country with the Continent. The Southern Railway, the largest holder of the Tunnel Company's shares, had expressed the wish that the Tunnel Company should continue its life struggle.

New Station for Gatwick Airport.—Tinsley Green will be the name of the new railway station which is being built by the Southern Railway between Gatwick and Three Bridges to serve the new Gatwick airport. The aerodrome is just south of Gatwick, and the new station will be adjacent to the aerodrome with special access between the two. A special feature of the work is that, although platforms only for the local lines are at present being provided, the layout has been so arranged that additional platforms can be built to serve the fast through lines, if required. The new station will be connected with London by frequent services of electric trains throughout the year.

New Passimeter Booking Offices.—The L.N.E.R. is proposing to extend the use of passimeter booking offices to Middlesbrough and Hartlepool stations. The passimeter office at Middlesbrough will be on the down platform, and at Hartlepool on the main platform.

Railway Rates Tribunal.—The Railway Rates Tribunal after two days' hearing reserved its decision on May 22 in the annual review of standard and exceptional charges of the four group railways. Mr. W. V. Wood, Vice-President, L.M.S.R., gave evidence for all the companies. No general revision of railway rates and charges, either up or down, was proposed by the companies.

New L.M.S.R. Southend Line Station Opened.—The new station at Elm Park, near Hornchurch, on the L.M.S.R. Southend line, was opened by the Minister of Health, Sir E. Hilton Young, on May 18. This is the eighth station to be opened on this section in the last three years. At the same time Sir Hilton Young declared open a housing estate, served by Elm Park station, which will eventually accommodate 35,000 persons.

Chinese Eastern Railway.—Over 2,000 men are now engaged in converting the 5-ft. gauge track of the C.E.R. (now the North Manchuria Railway) to 4 ft. 8½ in. gauge over the 150 miles between Hsinking and Harbin, and it is expected that through trains from Dairen to Harbin will begin running at the end of August. Our Manchukuo correspondent gave details of the conversion which we published, with sketch plans, on p. 774 of our issue of April 26.

British Standards Institution.—This institution is holding its annual meeting on Tuesday, May 28, subsequent to which a luncheon will be held at the Royal Automobile Club. Dr. E. L. Burgin, M.P., Parliamentary Secretary to the Board of Trade, and the Rt. Hon. G. W. Forbes, Prime Minister of New Zealand, will be the chief speakers. Dr. E. F. Armstrong, F.R.S., the retiring Chairman of the B.S.I., will preside and will be supported by Mr. W. Reavell (Ipswich), the newly elected Chairman for the forthcoming year.

Reduced Fares for the "Grandes Fêtes de Paris."—Visitors to France for the *Grandes Fêtes* in Paris from May 26 to July 7 will be able to obtain return tickets from the port of entry or frontier station to Paris and back at a reduction of 60 per cent. on the outward and 40 per cent. on the homeward journey, provided they spend at least six days in Paris. These tickets will be valid for travel in the outward direction from June 1 to June 30, and for return up to July 31. Holders of these tickets will be able to obtain further return tickets on the French railways at 40 per cent. reduction.

XUM

New Post Office at Paddington

On Wednesday, May 22, a new Post Office was opened at Paddington by Sir Kingsley Wood, the Postmaster-General. This Post Office, situated at the end of platform No. 1 near "The Lawn" circulating area, is the first completely equipped Post Office on a British railway station, available for all forms of Post Office business. In accordance with modern Post Office practice it is attractively designed and decorated in a scheme of black and cream with chromium steel fittings.

Sir Robert Horne, Chairman of the Great Western Railway, presiding at a luncheon which preceded the opening ceremony, referred to the mutual advantage of the new enterprise to the railway company and the Post Office, as well as the convenience afforded to the public. He presented to the Postmaster General a gold headed key with which to open the new office and said that the country felt that it had an asset in Sir Kingsley Wood, to whose spirit of business enterprise was due such innovations as that they were about to make.

Sir Kingsley Wood, in reply, referred to the dependence placed by the Post Office on the railway companies and the growth of the Post Office business handled by the railways. Last year 11¾ million letter bags passed through the London termini, of which Paddington dealt with some 17 per cent. of the total. He referred to the pioneering of the Great Western Railway, which had been the first to use motors for the conveyance of mails between Helston and the Lizard, and which had also been the first to inaugurate an air mail service. At Paddington, and he hoped at other London stations, there would in future be boy messengers wearing illuminated buttons with the words "telegrams accepted" in attendance for collecting telegrams from passengers at the departure of all the principal trains.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 20th Week			Totals to Date		
	1935	1934†	Inc. or Dec.	1935	1934	Inc. or Dec.
	£	£	£	£	£	£
L.M.S.R. (6,926½ mls.)						
Passenger-train traffic...	433,000	576,000	– 143,000	8,153,000	8,060,000	+ 93,000
Merchandise, &c. ...	474,000	454,000	+ 20,000	8,910,000	8,951,000	– 41,000
Coal and coke ...	217,000	216,000	+ 1,000	4,940,000	5,040,000	– 100,000
Goods-train traffic ...	691,000	670,000	+ 21,000	13,850,000	13,991,000	– 141,000
Total receipts	1,124,000	1,246,000	– 122,000	22,003,000	22,051,000	– 48,000
L.N.E.R. (6,336 mls.)						
Passenger-train traffic	278,000	340,000	– 62,000	5,349,000	5,234,000	+ 115,000
Merchandise, &c. ...	320,000	300,000	+ 20,000	6,125,000	6,270,000	– 145,000
Coal and coke ...	216,000	218,000	– 2,000	4,637,000	4,841,000	– 204,000
Goods-train traffic ...	536,000	518,000	+ 18,000	10,762,000	11,111,000	– 349,000
Total receipts	814,000	858,000	– 44,000	16,111,000	16,345,000	– 234,000
G.W.R. (3,749¼ mls.)						
Passenger-train traffic...	117,000	231,000	– 54,000	3,399,000	3,404,000	– 5,000
Merchandise, &c. ...	197,000	190,000	+ 7,000	3,551,000	3,564,000	– 13,000
Coal and coke ...	99,000	92,000	+ 7,000	2,040,000	2,103,000	– 63,000
Goods-train traffic ...	296,000	282,000	+ 14,000	5,591,000	5,667,000	– 76,000
Total receipts	473,000	513,000	– 40,000	8,990,000	9,071,000	– 81,000
S.R. (2,172 mls.)						
Passenger-train traffic...	269,000	344,000	– 75,000	5,107,000	5,006,000	+ 101,000
Merchandise, &c. ...	66,500	67,000	– 500	1,179,500	1,264,500	– 85,000
Coal and coke ...	27,500	26,000	+ 1,500	636,500	685,500	– 49,000
Goods-train traffic ...	94,000	93,000	+ 1,000	1,816,000	1,950,000	– 134,000
Total receipts	363,000	437,000	– 74,000	6,923,000	6,956,000	– 33,000
Liverpool Overhead ... (6½ mls.)	1,109	1,082	+ 27	22,147	21,489	+ 658
Mersey (4½ mls.) ...	3,738	4,036	– 298	82,009	83,619	– 1,610
*London Passenger Transport Board ...	550,200	551,100	– 900	24,668,600	24,096,400	+ 572,200
IRELAND						
Belfast & C.D. pass. (80 mls.)	1,909	1,770	+ 139	38,276	36,940	+ 1,336
,, ,, goods	612	571	+ 41	9,867	10,660	– 793
,, ,, total	2,521	2,341	+ 180	48,143	47,600	+ 543
Great Northern pass. (543 mls.)	8,450	8,250	+ 200	172,400	155,400	+ 17,000
,, ,, goods	10,650	9,650	+ 1,000	175,800	171,650	+ 4,150
,, ,, total	19,100	17,900	+ 1,200	348,200	327,050	+ 21,150
Great Southern pass. (2,124 mls.)	21,985	20,738	+ 1,247	408,417	395,456	+ 12,961
,, ,, goods	33,718	31,542	+ 2,176	708,214	649,645	+ 58,569
,, ,, total	55,703	52,280	+ 3,423	1,116,631	1,045,101	+ 71,530

* 46th week, the receipts for which include those undertakings not absorbed by the L.P.T.B. in the corresponding period last year; last year's figures are, however, adjusted for comparative purposes

† Whitsuntide, 1934

British and Irish Railways Stocks and Shares

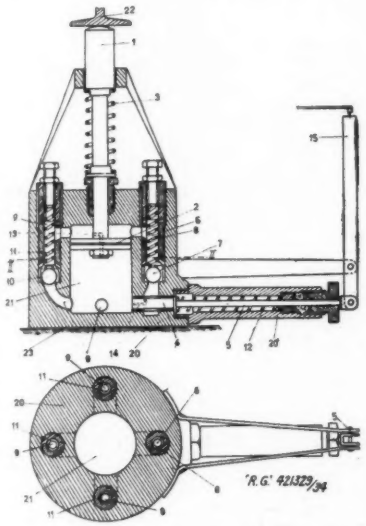
Stocks	Highest 1934	Lowest 1934	Prices May 22, 1935	Rise/Fall
G.W.R.				
Cons. Ord. ...	66½	48½	49	—
5% Con. Prefce. ...	118	109	119½	+1
5% Red. Pref. (1950)	115	107	111½	—
4% Deb.	117	105	115	+1
4½% Deb.... ...	119	109	116½	+1
4½% Deb.... ...	129½	115¼	126½	+1
5% Deb.	135	126¼	137½	+1
2½% Deb.... ...	75	64	78	—
5% Rt. Charge ...	134⁷/₁₆	123¼	134½	+2
5% Cons. Guar. ...	132¾	121¾	130½	+1½
L.M.S.R.				
Ord.	30½	19½	17½	–1
4% Prefce. (1923)	64¼	41	51½	—
4% Prefce. ...	87	69½	80½	–½
5% Red. Pref. (1955)	107	92½	102½	+1
4% Deb.	114⅛	100½	109½	+½
5% Red. Deb. (1952)	118¹¹/₁₆	111¼	115½	—
4% Guar.	106½	96¾	103	—
L.N.E.R.				
5% Pref. Ord. ...	24¾	13½	11½	–½
Def. Ord.	11½	6⅞	5⅞	–⅛
4% First Prefce. ...	76	59½	60½	–½
4% Second Prefce.	47	25½	22½	–1
5% Red. Pref. (1955)	94½	80	81½	—
4% First Guar. ...	104	92	101	+½
4% Second Guar.	97⅞	86½	93½	+½
3% Deb.	90	74½	84½	—
4% Deb.	114	99¼	108	+1
5% Red. Deb. (1947)	117	108	113½	—
4½% Sinking Fund Red. Deb.	111¼	105¼	111	—
SOUTHERN				
Pref. Ord.... ...	90	63⅛	86	—
Def. Ord.	32⅝	19	23½	–½
5% Prefce. ...	118³/₁₆	107½	120½	+1
5% Red. Pref. (1964)	115¾	107½	115½	—
5% Guar. Prefce.	132	120¾	129½	+1½
5% Red. Guar. Pref. (1957)	119½	113	118½	+1
4% Deb.	116½	103¼	114½	+1
5% Deb.	134	124¹³/₁₆	135½	—
4% Red. Deb. 1962–67	113¹¹/₁₆	105⁹/₁₆	112½	—
BELFAST & C.D.				
Ord.	8	5	5	—
FORTH BRIDGE				
4% Deb.	110	100	109½	—
4% Guar.	110	100	108½	—
G. NORTHERN (IRELAND)				
Ord.	9¾	4¹⁵/₁₆	9	—
G. SOUTHERN (IRELAND)				
Ord.	25	12½	25	—
Prefce.	21½	13¹⁵/₁₆	25	—
Guar.	48	39	60	+1½
Deb.	67	59	75	+2
L.P.T.B.				
4½% "A" ...	126	115	125½	+1
5% "A"	135½	124½	135½	+1
4½% "T.F.A." ...	113½	107½	112	—
5% "B"	131¾	118	128½	—
"C"	97	73	100	—
MERSEY				
Ord.	15¼	7	12	—
4% Perp. Deb. ...	93½	82½	95½	—
3% Perp. Deb. ...	66½	61½	69½	—
3% Perp. Prefce....	54	44½	52½	—

ABSTRACTS OF RECENT PATENTS*

No. 421,329. Pressure-operated Contact Devices

V. Barbora, of 5, Myslikova Street, Prague II, Czechoslovakia, and J. Fryba, of 107, Ceskomoravská Street, Prague VIII, Czechoslovakia. May 22, 1934. (Convention Date: May 20, 1933.)

A pressure-operated contact device for railway signalling and level crossing operating systems consists of a closed casing 20 formed as a main central cylinder 21 which contains a movable piston 2 having a piston rod 1 which is pressed upwardly against the lower surface of the rail 22 by a spring 3.

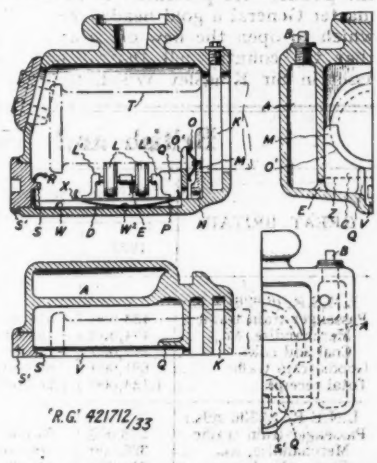


The casing 20 is supported on a convenient base in such manner that the piston 2 with its piston rod 1 moves between the lower solid base 23 or the bottom of the casing 20 and the oscillating rail 22. The casing 20 is filled with a liquid such as glycerine or oil. An auxiliary working piston 4 with piston rod 5 is arranged in the casing wall, the rod 5 extending from one side of the casing and having a return spring 12 guided in a correspondingly tubular side part 20^1. The liquid in the main cylinder 21 of the casing, when under pressure due to sudden vertical movements of the rail, acts on the auxiliary piston 4, the movement of this being greater than the movement of the main piston 2. The movement of piston 4 is further magnified by a lever 15. A vertical channel 6 is provided above the auxiliary piston 4 and three or more other auxiliary channels are also used. Each channel is provided with a non-return ball valve 7 and 10, respectively, loaded from above by a spring 8 or 11. A channel 13 is formed through the main piston 2 and piston rod 1 and a channel 14 in the auxiliary piston 4. A relatively sudden and strong downward movement of the main piston 2 caused by a railway vehicle on the rail 22 exerts a pressure on the liquid below the piston 2 in the main cylinder 21 which acts on the small working piston 4, the piston rod 5 of which is pushed outwards and acts through the lever 15 on the contact device proper. Quite a small movement of the main piston 2 is sufficient to produce a much greater movement of the auxiliary working piston 4, due to the difference in the diameters of both pistons 2 and 4. For such a sudden and violent movement of the piston 2 the fine channels 13 and 14 of both pistons 2 and 4 are too small to allow the free passage of the liquid under pressure from the lower part of the cylinder 21, although these channels are sufficient to pass the liquid flow when the main piston 2 moves slowly due to the settling down of the rail 22. In the case of a sudden and violent movement of piston 2 the non-return valves 7 and 10 in the channels 6 and 9 allow the superfluous liquid to pass into the cylinder above the piston 2 when the working piston 4 has already performed its complete stroke.—(*Accepted December 18, 1934.*)

No. 421,712. Axleboxes

G. W. D. Leslie, of 14, O'Connell Street, Sydney, New South Wales, Australia, and R. B. W. Leslie, of 11, Cypress Street, Launceston, Tasmania. June 28, 1934. (Convention Date: June 28, 1933.)

Oil reservoirs A-A are cored in each side wall of the box and are each provided with a filler plug B at their top ends. At their bottom ends they are in communication with the oil bath cell C, which occupies the centre part of the box. Oil passes slowly from the reservoirs A-A into the bottom of the cell C through apertures E in the partition walls until the oil level in the cell C comes above these apertures, whereupon the oil flow ceases until the level drops again and exposes the apertures E. Thus a constant feed of clean oil to the cell C is assured. Leakage of oil from the cell C past the shoulder of the journal T into the slotway K is prevented by a half circle obturator member M, which is kept in contact with the journal fillet by a curved leaf spring N and pushed backward by leaf springs O secured thereto and bearing against a cross ridge O' on the cell bottom. The floor plate W of the oil distributor cradle P is embraced at its back end between two upstanding lugs Q which are integral with the cross ridge O'. The floor plate W is latched in centre position in the cell C by engagement of a staple hole in the tail piece R on its outer end with a latch lug S which projects inward from a closure plug S in the outer end of the axlebox. The distributor rollers L contact peripherally with the underside of the axle journal T, and are held up to contact therewith by a curved leaf spring D which is riveted at W^2 to the floor plate W of the cradle and engages between notches in the ends of the cradle carrier plate X on which the bearing brackets L'-L^2 which carry the lubricator rollers L are fixed. The rear bearing bracket L^2 is supported laterally by the upstanding lugs Q and the erectness of the cradle is thus ensured. The lubricator rollers L have angle section



peripheral grooves in their ends. These grooves fill with oil from the well and carry this oil up to the journal, ensuring adequate oil service. Excess oil is squeezed to a film between the peripheral faces of the rollers L and the surface of the journal. The bottom of the axlebox is inclined downwards and is grooved centrally as shown at V to provide a seating channel for the floor plate W of the lubricator cradle.—(*Accepted December 28, 1934.*)

No. 422,707. Automatic Drifting Valves

H. Wood, of 68, Nether Street, Woodside Park, Finchley, N.12, and J. Tomlinson, of 48, St. John's Park, Blackheath, S.E.3. July 17, 1933.

A drifting steam control for railway engines primarily governed by the motion of the locomotive comprises a valve casing having inlet and outlet connections for drifting steam and a piston valve with opposed ram areas slidable in the casing for controlling the passage of the drifting steam between these connections. The piston valve is actuated in the opening direction, for supplying drifting steam, by an accumulated pressure built up in accordance with the motion of the locomotive and acting on one of the

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ram areas, and in the closing direction, to cut off drifting steam, by steam chest pressure acting on the other ram area, and means are provided for continuously venting the accumulated pressure. The piston valve *a*, Fig. 1, is shown in the position in which drifting steam passes from the boiler through a pipe *b* (Fig. 4) to an annular chamber *c* and through the cavity of the valve *a* to a pipe *d* leading to the steam chests. The piston valve has differential ram areas, the smaller area *k* moving in a casing sleeve *f* provided with apertures *e* which permit the passage of drifting steam from the chamber *c* into the valve cavity within the casing *f* and thence through another series of apertures e^1 into a

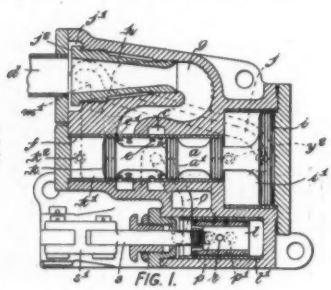


FIG. 1.

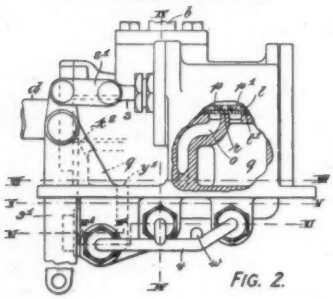


FIG. 2.

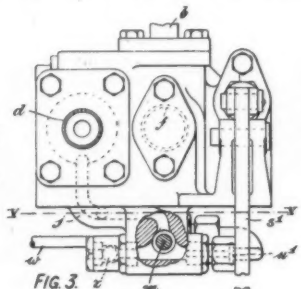


FIG. 3.

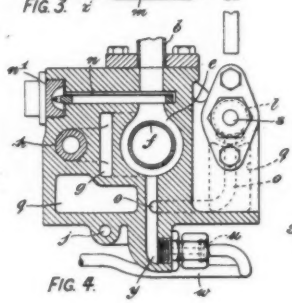


FIG. 4.

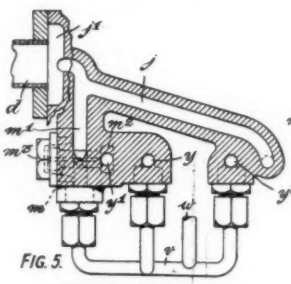


FIG. 5.

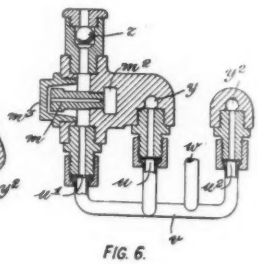


FIG. 6.

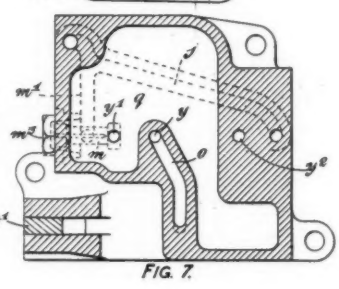


FIG. 7.

'R. G.' 422707/33

ber *c*, to a passage *o* leading to a port *p* in the casing l^1 of the reciprocating valve *l*. A delivery port p^1 in the casing l^1 communicates with a reservoir chamber *q* (Fig. 2) and this chamber is in free communication with the small area *k* of the piston valve *a* by way of a port k^2. The hollow valve *l* is formed with a port *r* which registers with the ports *p* p^1 alternately as the device is reciprocated. The valve *l* may be reciprocated by a rod *s* actuated through link work s^1 by the valve rocker gear. Each time the port *r* uncovers the admission port *p* a definite charge of steam is admitted to the chamber of the valve *l* and each each time the port *r* uncovers the delivery port p^1 such charge is delivered to the chamber *q* for the accumulation of pressure therein. This accumulated pressure is continuously vented from the chamber *q* by way of the port y^1 m^2 (Figs. 5 to 7) choke nozzle *m* and passage m^1 to the pipe *d*.

Assume that the locomotive is running under steam with the valve *a* in the leftward position in Fig. 1, in which it cuts off drifting steam. If the regulator is closed and the locomotive drifts, steam pressure falls in the pipe *d*, and branch *j* and on the large area *i* so that the accumulated pressure on the small area *k* moves the valve *a* into the rightward position seen in Fig. 1, for admitting drifting steam to the pipe *d*. The flared nozzle *h* reduces by expansion the pressure of the drifting steam passing to the pipe *d*. The pressure communicated to the larger area *i* through the annular chamber j^1 is low compared with the pressure on the smaller area *k*, particularly for so long as the flow of steam is maintained by the drifting movement. As the locomotive speed is reduced to dead slow, the reciprocations of the valve *l* are correspondingly reduced in number, so that less steam is delivered in the chamber *q*. As this chamber is continuously vented, the pressure on the small area *k* will be then considerably reduced. At a dead slow speed, the flow of drifting steam past the slot j^3 and to the cylinder chests is considerably reduced and ceases when the locomotive stops. As the locomotive approaches to a stoppage, therefore, the conditions favour the creation of a preponderating pressure on the area *i* to overcome the resistance due to pressure on the area *k*, and move the drifting valve leftwards to shut off drifting steam. As the locomotive comes to rest, pressure on the area *k* equalises with the drifting steam pressure on the area *i* so that the steam must then positively move the drifting valve *a* leftwards, if it has not already done so.—(*Accepted January* 17, 1935.)

goose-neck pipe *g* and nozzle *h* to the pipe *d*.

When pressure on the larger area *i* moves the piston valve to the left of Fig. 1, which is the position it occupies when the locomotive is running with the regulator open, the piston rings a^1 on the valve *a* move past the apertures *e* thereby cutting off the supply of drifting steam to the pipe *d*. The piston valve *a* is maintained in the leftward position by chest pressure communicated from the pipe *d* by way of a branch *j* to the larger area *i* of the valve *a*. The branch *j* communicates with the pipe *d* through an annular chamber j^1 which leads to said pipe by way of a restricted slot opening j^2 around the larger end of the nozzle *h*. When the regulator is open such chest pressure overcomes a pressure which accumulates at the smaller area *k* owing to a number of steam admissions affected by a reciprocating hollow valve device *l* actuated when the locomotive is in motion.

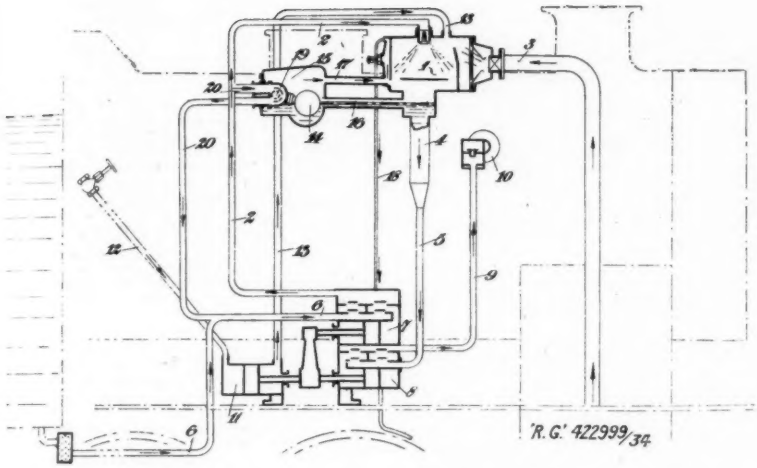
The steam for building up pressure on the smaller area *k* of the valve is supplied from the pipe *b*. This steam passes through a copper gauze sieve *n* (Fig. 4), through the annular cham-

No. 422,999. Feed Water Heaters

Société Française des Pompes et Machines Worthington, of Rue du Commandant Rolland, Le Bourget, France. April 16, 1934. (*Convention Date: April* 15, 1933.)

In a steam locomotive feed heating installation, a direct-contact feed heater 1 in the form of a jet condenser is supplied with cold feed water by a pipe 2. Exhaust steam is supplied to the heater by pipe 3 and the heated feed water collects in the receptacle 4 from which it may be withdrawn through pipe 5. The cold feed water is conveyed through a pipe 6 and is delivered to the pipe 2 by means of a pump 7. The water accumulating in the heater 1 is delivered, by means of a pump 8 and pipe 9, to the injector 10 and thence to the boiler. The pump pistons are driven from the steam cylinder 11, which is supplied with live steam through a pipe 12. The exhaust from the cylinder 11 is led into the heater through the pipe 13.

The quantity of exhaust steam



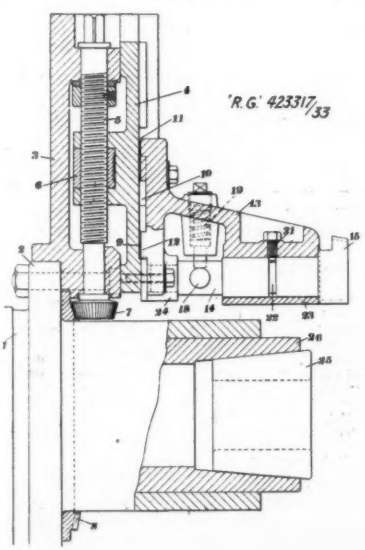
which enters the heater 1 is variable, whereas the discharge of each of the pumps 7 and 8 is constant, and it is therefore necessary to regulate the quantity of water in the heater. This is effected by providing a float 14 in a chamber 15 which communicates with a receptacle 4 of the heater by way of a conduit 16, so that the level in the chamber 15 is always the same as that in the receptacle 4. A pipe 17 also connects this chamber 15 with the heater at a point above the water level in the receptacle 4 to permit circulation of air, any excess air being allowed to escape from the heater through the pipe 18. The float 14 is arranged to actuate a valve 19 which is placed in a pipe line 20, branching off from the discharge pipe 2 of the pump 7 and connected at its other end to the suction 6 of the pump. The level of water in the receptacle 4 controls the position of the valve 19, and when this level falls below normal, thus rendering it desirable to increase the supply of water to the heater, the float 14 causes the valve 19 to close, so that the whole of the discharge of the pump 7 is delivered to the heater to make up the deficiency. Should the level in the receptacle 4 rise above the normal, the float 14 will lift and open valve 19. In this way, a proportion of the discharge of pump 7 is returned through the pipe 20 to the suction of this pump, and thus the supply of water to the heater is reduced and a condition of equilibrium thereby re-established.—(*Accepted January* 23, 1935.)

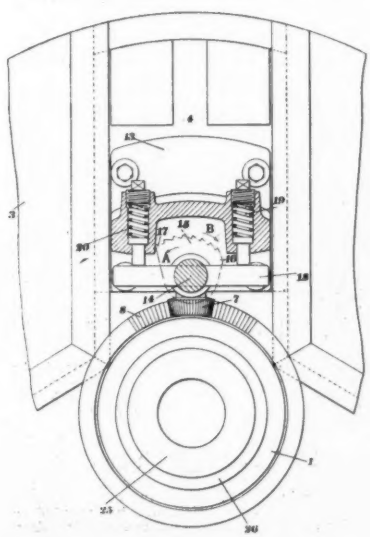
No. 423,317. Railway Wheel Lathes

Craven Brothers (*Manchester*) *Limited, and S. R. Howes, both of Vauxhall Works, Reddish, Stockport, and A. D. Mortimer, of* 61, *South Promenade, St. Annes-on-Sea, Lancashire. November* 3, 1933.

In a chuck for a lathe for turning the treads of railway wheels, which has a number of gripping jaws mounted upon radial slides all moved positively and in unison across the chuck face, serrated cam-shaped gripping jaws are mounted upon shafts parallel to the lathe axis carried by the slides, the shafts being each permitted a limited amount of turning movement in either direction against spring pressure so that all the gripping jaws are brought to bear upon the rim of the wheel before further movement of the slides is prevented. A wheel lathe spindle 1 carries, registering on a flange 2, a chuck body 3, carrying a jaw-slide 4 operated by a screw 5, engaging a nut 6, which is controlled endwise in the slide 4. The screw 5 terminates at its inner end in a bevel pinion 7 meshing with a bevel wheel 8 concentric with the chuck, and when the screw 5 is rotated by hand, the pinion 7 rotates the wheel 8 which in turn rotates the other screws of the chuck. The slide 4 is provided with a number of tenon ways 9, 10, and 11, any one of which may accommodate the tenon 12 of the jaw-carrier 13, so that the latter may be set to various positions, each further from the centre of the chuck than its predecessor and clamped in such positions to the jaw-slide 4, so that with a comparatively short movement of the nut 6, a large range of wheel diameters can be accommodated.

In the jaw-carrier 13 is mounted a spindle 14 carrying a serrated cam 15 acting as a gripping jaw. This cam 15 gradually rises in diameter from the tooth 16 to the tooth 17. The cam 15 is maintained in a suitable initial position by the cross bar 18 opposed on opposite sides by springs 19 and 20. The spindle 14 is maintained in position axially by a screw 21 in a groove 22 of the spindle and is journalled at 23 in the outer end, and at 24 in the inner end, of the jaw-carrier 13. The split collet chuck 25 is applied to the journal bearing of the wheel axle, and pushed into the cone fitting 26 mounted in the nose of the spindle 1. The cams on the jaws enter the wheel rim between the spokes and one of the screws 5 is rotated by hand until, in the case of a slightly eccentric rim, one of the serrated cams 15 comes in contact with the rim. Continued pressure by the screw 5 will cause the jaw to continue advancing towards the rim, and by its shape the cam will be caused to rotate in the direction A. Continued operation of screw 5 will eventually bring the other cams into operation on the slightly excentric rim, when the operation of turning may be begun. The immediate effect of the turning operation is to rotate all cams in the direction of arrow B until serrations on all the cams have bitten so strongly into the work that the opposition of the cut is not sufficient to rotate them any further.—(*Accepted January* 30, 1935.)





COMPLETE SPECIFICATIONS ACCEPTED

421,067. Safety apparatus for controlling electric railway locomotives and vehicles. International General Electric Co., Inc.

421,016. Railway-axle journal lubricators. Leslie, G. W. D.

OFFICIAL NOTICES

Egyptian Government

APPOINTMENT OF A JIG AND TOOL DESIGNER

APPLICATIONS are invited for appointment of a Jig and Tool Designer in the Mechanical Department of the Egyptian State Railways Administration.

Applicants must be of British Nationality and possess the following qualifications :—

Must have obtained a thorough experience in the design of Jigs and their application, the design of modern, special-purpose machine tools and their application.

Also capable of getting out the Lay-out of Machine Operations under the instructions of the Production Branch.

The salary offered is £E480 per annum, to be increased to £E510 after two years' service, and is subject to stamp duty of about £E16 and £E17 respectively (£E1 = £1 0s. 6d. approx.).

Appointment will be on contract for three years commencing on the day of reporting for duty in Cairo.

The appointment is subject to medical examination in London and approval of the Authorities in Egypt.

The selected candidate will be granted a transfer allowance equal to one month's salary for change of residence from England to Egypt and *vice versa*.

Third class fares and reasonable out of pocket expenses will be paid to applicants who are requested to attend for interview and/or medical examination in London.

Application and specimen contract forms may be obtained from :—

The Chief Inspecting Engineer,
Egyptian Government,
41, Tothill Street,
London, S.W.1.

to whom they should be returned, with full particulars as to education, qualifications, previous experience, personal references and Copies (not originals) of certificates or testimonials.

Envelopes to be inscribed Jig and Tool Designer.

Egyptian Government

APPOINTMENT OF A WORKS MANAGER

APPLICATIONS are invited for a Works Manager (Locomotive Repair Shops and manufacture) in the Mechanical Department of the Egyptian State Railways Administration.

Applicants must be of British nationality, between 40 and 50 years of age, and possess the following qualifications :—

Must have obtained thorough experience and, if possible, held charge of repairs or building of locomotives for at least fifteen years in a recognised up-to-date Workshop, preferably in a Railway Workshop; be thoroughly conversant with modern machinery, production methods and workshop practice; have obtained a thorough experience in the control of staff; be capable of training those under him; and be of temperament suitable for the post of a Works Manager.

Must be capable of putting in an organisation for modern production methods, progress, planning, and conversant with Workshop costing, and capable of being responsible for the out-turn and quality of that out-turn from the Workshops and for the Administration in the Workshops.

The salary offered is £E1,020 per annum, to be increased to £E1,100 after two years' service, and is subject to stamp duty of about £E41 and £E44 respectively (£E1 = £1 0s. 6d. approx.).

Appointment will be on contract for five years commencing on the day of reporting for duty in Cairo.

The appointment is subject to medical examination in London and approval of the Authorities in Egypt.

The selected candidate will be granted a transfer allowance equal to one month's salary for change of residence from England to Egypt and *vice versa*.

Third class fares and reasonable out of pocket expenses will be paid to applicants who are requested to attend for interview and/or medical examination in London.

Application and specimen contract forms may be obtained from :—

The Chief Inspecting Engineer,
Egyptian Government,
41, Tothill Street,
London, S.W.1,

to whom they should be returned, with full particulars as to education, qualifications, previous experience, personal references and Copies (not originals) of certificates or testimonials.

Envelopes to be inscribed Works Manager.

Egyptian Government

APPOINTMENT OF A DEPUTY CHIEF MECHANICAL ENGINEER

APPLICATIONS are invited for appointment of a Deputy Chief Mechanical Engineer (Workshops) in the Egyptian State Railways Administration.

Applicants must be of British nationality, between 40 and 50 years of age, and possess the following qualifications :—

Should have had twenty years' experience in a modern Workshop, preferably a Railway Repair Shop and, if possible, should have had actual experience in charge of Workshops.

Should be capable of dealing with all questions of Administration and co-ordination of work for the Locomotive Repair Shops, Carriage Repair Shops and Wagon Repair Shops.

Be responsible under the Chief Mechanical Engineer for the construction and Shops repairs of all Rolling Stock, including Locomotives; and for the maintenance of all Workshop plant to the standard required for the efficient and economic execution of its work.

Be capable of handling labour, and thoroughly conversant with the control of costs and out-turn from these Workshops.

Should be thoroughly conversant with the latest up-to-date Workshop practice, and of a suitable type to control and direct the Workshop Managers of these Workshops.

The salary offered is £E1,200 per annum, to be increased to £E1,400 after two years' service, and is subject to stamp duty of about £E48 and £E55 respectively (£E1 = £1 0s. 6d. approx.).

Appointment will be on contract for five years commencing on the day of reporting for duty in Cairo.

The appointment is subject to medical examination in London and approval of the Authorities in Egypt.

The selected candidate will be granted a transfer allowance equal to one month's salary for change of residence from England to Egypt and *vice versa*.

Third class fares and reasonable out of pocket expenses will be paid to applicants who are requested to attend for interview and/or medical examination in London.

Application and specimen contract forms may be obtained from :—

The Chief Inspecting Engineer,
Egyptian Government,
41, Tothill Street,
London, S.W.1,

to whom they should be returned, with full particulars as to education, qualifications, previous experience, personal references and Copies (not originals) of certificates or testimonials.

Envelopes to be inscribed Deputy C.M.E.

Egyptian Government

APPOINTMENT OF AN ASSISTANT WORKS MANAGER

APPLICATIONS are invited for appointment of an Assistant Works Manager (Production) in the Mechanical Department of the Egyptian State Railway Administration.

Applicants must be of British nationality and possess the following qualifications :—

Must have obtained a thorough experience in Modern Methods of production, progress, planning and Workshop costing for at least ten years in a recognised up-to-date Workshop, and be capable of organising the work of the Production Branch to produce the goods in the shortest time by the cheapest method of the correct quality and in the predetermined time.

Must have had experience with production from Modern High Speed Machines, be capable of setting up Machine Tool Lay-outs, the design and use of Jigs, planning machine and time operations and have had experience of High Speed Tool Steel and Heat Treatment; be capable of putting in methods of working to tolerances, the introduction of a gauging system and initiating standardisation and training those under him.

The salary offered is £E840 per annum, to be increased to £E900 after two years' service, and is subject to stamp duty of about £E33 and £E35 respectively (£E1 = £1 0s. 6d. approx.).

Appointment will be on contract for five years commencing on the day of reporting for duty in Cairo.

The appointment is subject to medical examination in London and approval of the Authorities in Egypt.

The selected candidate will be granted a transfer allowance equal to one month's salary for change of residence from England to Egypt and *vice versa*.

Third class fares and reasonable out of pocket expenses will be paid to applicants who are requested to attend for interview and/or medical examination in London.

Application and specimen contract forms may be obtained from :—

The Chief Inspecting Engineer,
Egyptian Government,
41, Tothill Street,
London, S.W.1,

to whom they should be returned, with full particulars as to education, qualifications, previous experience, personal references and Copies (not originals) of certificates or testimonials.

Envelopes to be inscribed Assistant Works Manager.

Egyptian Government

APPOINTMENT OF A FOUNDRY FOREMAN

APPLICATIONS are invited for appointment of a Foundry Foreman in the Mechanical Department of the Egyptian State Railway Administration.

Applicants must be of British nationality and possess the following qualifications :—

Must have obtained experience in an up-to-date recognised Foundry for at least ten to fifteen years, preferably in a Railway Foundry, have had experience in the casting of non-ferrous work, and in up-to-date machine moulding, and be capable of training those under him.

The salary offered is £E480 per annum, to be increased to £E510 after two years' service, and is subject to stamp duty of about £E16 and £E17 respectively (£E1 = £1 0s. 6d. approx.).

Appointment will be on contract for three years commencing on the day of reporting for duty in Cairo.

The appointment is subject to medical examination in London and approval of the Authorities in Egypt.

The selected candidate will be granted a transfer allowance equal to one month's salary for change of residence from England to Egypt and *vice versa*.

Third class fares and reasonable out of pocket expenses will be paid to applicants who are requested to attend for interview and/or medical examination in London.

Application and specimen contract forms may be obtained from :—

The Chief Inspecting Engineer,
Egyptian Government,
41, Tothill Street,
London, S.W.1,

to whom they should be returned, with full particulars as to education, qualifications, previous experience, personal references and Copies (not originals) of certificates or testimonials.

Envelopes to be inscribed Foundry Foreman.

BUENOS AYRES WESTERN RAILWAY Limited. The Registers of the Company's Four per Cent. and Five per Cent. Debenture Stocks will be Closed from Tuesday, the 28th May, to Monday, the 10th June, both days inclusive, for the purpose of preparing the half-yearly interest warrants.

By Order of the Board,
ROBERT GRAHAM,
Secretary.

Offices of the Company,
River Plate House,
Finsbury Circus, E.C.2
20th May, 1935.

THE ASSAM-BENGAL RAILWAY COMPANY LIMITED is prepared to receive Tenders for :—

400 TYRES FOR CARRIAGES AND WAGONS.

Specifications and Tender Forms may be obtained at the Offices of the Company, 56, Victoria Street, S.W.1. A fee of £1 1s. is charged for each specification, which cannot be returned.

Drawings may be had at the cost of the tenderer by application to Messrs. Hodges, Bennett & Co. Ltd., 78, Queen Victoria Street, E.C.4.

Tenders must be delivered at the Company's Offices not later than noon on Wednesday, the 29th May, 1935.

The Directors do not bind themselves to accept the lowest or any tender.

By Order of the Board,
W. H. J. GORE,
Secretary.

20th May, 1935.

Official Notices—*continued*

South Indian Railway Company Limited

THE DIRECTORS are prepared to receive Tenders for the supply of :—

7 LOCOMOTIVE TANK ENGINES (P.T. Class) BROAD GAUGE.

Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders addressed to the Chairman and Directors of the South Indian Railway Co. Ltd., marked "Tender for Locomotive Engines," with the name of the firm tendering, must be left with the undersigned not later than 12 noon on Friday, the 28th June, 1935.

The Directors do not bind themselves to accept the lowest or any tender.

A charge, which will not be returned, will be made of £2 for each copy of the Specification.

Copies of the drawings may be obtained from the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, Westminster, S.W.1.

A. MUIRHEAD,
Managing Director.

91, Petty France,
Westminster, S.W.1.
22nd May, 1935.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to :—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

The Buenos Ayres Great Southern Railway Company Limited

THE Directors of the Buenos Ayres Great Southern Railway Company, Limited, hereby give notice that the REGISTER of DEBENTURE STOCKHOLDERS will be CLOSED from Friday, the 31st May, to Thursday, the 13th June, 1935, both days inclusive.

By Order of the Board,
ROBERT GRAHAM,
Secretary.

River Plate House,
Finsbury Circus,
London, E.C.2.
22nd May, 1935.

CONTRACTS AND TENDERS

Craven's Railway Carriage & Wagon Co. Ltd. has received an order from the National Benzol Co. Ltd. for 16 14-ton tank wagons for the conveyance of Class A inflammable liquids.

Beyer-Garratt Locomotives for Nigeria

Beyer, Peacock & Co. Ltd. has received an order through the Crown Agents for the Colonies for four Beyer-Garratt mixed-traffic 4-6-2 + 2-6-4 articulated steam locomotives for service on the Nigerian Railway. These locomotives are designed for working on a 45-lb. rail, 3 ft. 6 in. gauge, and will develop a tractive effort of approximately 33,500 lb. at 85 per cent. boiler pressure. The maximum axleload is to be 9¾ tons. Two of the engines will have 225 lb. per sq. in. boiler pressure and 12¾ in. × 26 in. cylinders, and the remaining two 200 lb. boiler pressures and 13½ in. × 26 in. cylinders. The boilers and cylinders throughout are so designed that all the engines can be worked eventually at the higher or the lower pressure. Skefko roller bearings for the bogie and carrying wheels and Whitelegg & Rogers system of grease lubrication will be standard on all the locomotives, while two will be fitted with the Kylchap blast pipe.

Cowans Sheldon & Co. Ltd. has received an order from the L.N.E.R. for a 70-ft. diameter turntable for York locomotive depot.

The P. & M. Co. (England) Ltd. has received orders from the North Western Railway of India for a total of approx. 269,000 rail anchors.

The Cargo Fleet Iron Co. Ltd. has received orders from the Bhavnagar State Railway, to the inspection of Messrs. Robt. White & Partners, for 11,000 tons of 50-lb. R-section rails and 32 tons of fishplates.

The Swiss Locomotive and Machine Works, Winterthür, has received an order from the Aciéries du Nord, of Hautmont, for 76 complete mechanical transmissions incorporating S.L.M.-Winterthür oil-operated gearboxes. These sets are for installation in 41 diesel railcars for the French Northern, Eastern, and P.O.-Midi Railways. Some of these cars are to be powered by two 300-b.h.p. engines.

The General Electric Co. Ltd. has received a contract from the Great Western Railway for a 12 months' supply of Osram lamps for train-lighting purposes.

The Swedish State Railways Administration invites tenders, closing on June 1, for 79,500 tons of coal.

Important Indian Orders

The Metropolitan-Cammell Carriage & Wagon Co. Ltd. has received orders from the Indian Railway Board, to the inspection of Messrs. Rendel, Palmer & Tritton, under the direction of the Director-General, India Store Department, London, for 450 CR type broad-gauge four-wheeled covered wagons for the G.I.P. Railway and 300 O-type broad-gauge four-wheeled open wagons, complete with vacuum and hand brake gear, for the East Indian Railway.

The Vulcan Foundry Co. Ltd. has received an order from the Rohilkund & Kumaon Railway for four superheated 4-6-0 locomotives. These locomotives are for mixed-traffic service on the metre gauge and will have Caprotti valve gear, A.C.F.I. feedwater heaters and six-wheeled tenders.

Hurst Nelson & Co. Ltd. has received an order from the Junagad State Railway, to the inspection of Messrs. Robt. White & Partners, for 12 metre-gauge IRCA bogie carriage underframes, complete with wheels and axles, and all vacuum brake gear except cylinders.

Egyptian Locomotive Inquiry

Tenders are invited by the Egyptian State Railways Administration, receivable at the General Management, Cairo, by August 15, for 15 side-tank locomotives required for the Minia auxiliary railways.

The administration also invites tenders, receivable by June 26, for three replacement boilers for locomotives, and, receivable by July 16, for the supply of machine tools.

The Egyptian State Railways Administration has placed orders as follow :—

British Thomson-Houston Co. Ltd. : Portable engine generator.
H. J. Skelton & Co. Ltd. : Mild steel flat bars.
William Jacks & Company : 458,000 kilos. pig iron.
P. & W. MacLellan Limited : 74,000 kilos. hematite.
Barrow Hematite Steel Co. Ltd. : 100,000 kilos. pig iron.

Ibbotson Bros. & Co. Ltd. has received an order for 1,400 helical springs for carriages and wagons for the Madras & Southern Mahratta Railway.

Stewarts and Lloyds Limited has received an order for 1,800 steel boiler tubes and 100 superheater smoketubes for the Buenos Ayres Great Southern Railway.

Brown Bayley's Steel Works Limited has received an order from the Mysore State Railways for 214 carriage and wagon tyres to the inspection of Messrs. Rendel, Palmer & Tritton.

Birmingham Electric Furnaces Limited has acquired the sole rights in the British Isles for the Lindberg regulator. This instrument has been supplied previously only by the Lindberg Steel Treating Company of Chicago, U.S.A., but will now be manufactured and sold in England as the Birlec-Lindberg controller. The primary function of this instrument is the provision of a simple, accurate means for regulating the heat input to furnaces heated by electricity, gas or oil. Its use, therefore, permits a high initial rate of heating to be obtained while allowing power to be reduced to any desired extent in order to minimise temperature fluctuations during "soaking" and when working at low temperatures. The Birlec-Lindberg controller is available in a number of types designed to meet every requirement and, by its use, an improved degree of control is obtained such as otherwise could be provided only by comparatively complicated and expensive electrical equipment.

Forthcoming Events

May 25 (*Sat.*).—Permanent Way Institution (Manchester-Liverpool), in Lecture Room, Central Station, Mersey Railway, Birkenhead, 3 p.m. "Recent Experiments in Permanent Way Practice," by Mr. W. Hepworth.

May 28-31.—Institution of Mechanical Engineers, at Bath. Summer Meeting.

May 29-31.—National "Safety First" Association, at Park Lane Hotel, London, W.1. Congress.

May 31 (*Fri.*).—Banquet at Savoy Hotel, London, 7.30 for 8 p.m., to celebrate Colonel R. E. B. Crompton's Ninetieth Birthday, The Hon. Sir Arthur Stanley, G.B.E., C.B., M.V.O., in the Chair.

The Railway Club, at Royal Scottish Corporation Hall, Fetter Lane, E.C.4, at 7.30 p.m. "How the Railways Fight the Snow," by Mr. H. A. Vallance.

XUM

Railway Share Market

There have been several adverse factors influencing the Home Railway stock and share markets during the week. The report that the three railway unions would shortly demand the full restoration of wage "cuts" imposed in 1931 led to the closing of commitments by many operators on the ground that whilst there was no reason to assume that the demand would not be resisted by the railways, it might be some time before the negotiations came to a conclusion and, in the meantime, business in the stock and share markets would be held up. There was also the announcement on Wednesday of a series of traffic decreases.

The decreases are partially caused by comparison going against the Whitsun traffic receipts of last year, but they nevertheless proved somewhat disappointing as they wiped out the aggregate increases which had been obtained up to the previous week. Southern results, which showed a decrease of £74,000, were particularly disappointing, as it had been anticipated that the maintenance of the "Jubilee" celebrations and also the visit of the Fleet to the Thames estuary would have created increased passenger traffic. The L.M.S. decrease was also considered to be unexpectedly large. There was not a large amount of stock offered on the posting up of the traffic returns in the market, but the general tendency became weak, and dealers were anticipating the public would come in sellers later when the demands of the railwaymen for full wage restoration had received greater publicity. Some of the prior lien stocks were marked back. There was a good deal of Southern 5 per cent. guaranteed preference about, and the price was lowered 1½ points to 128½—130½, with bargains done at 129, compared with 135 earlier this year. London & North Eastern debenture stocks were also a shade lower, whilst the second preference stock was on offer at below the price ruling on Monday.

Conditions in the Argentine railway market were unsatisfactory and prices moved against holders. The suggestion contained in the statement in the House of Commons that attention is being paid to the position by the Government did little to restore confidence. Even Cordoba Central issues receded, despite negotiations for the sale of the line to the Argentine Government.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1934-35	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1934	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1934	Prices: Lowest 1934	Prices: May 22, 1935	Yield % (See Note)
				£	£		£	£	£					
South & Central America.	Antofagasta (Chili) & Bolivia	830	19.5.35	12,800	— 1,580	20	248,000	257,270	— 9,270	Ord. Stk.	26¾	19	17½	Nil
	Argentine North Eastern ..	753	18.5.35	9,398	— 63	46	341,585	378,551	— 36,966	,,	11	6⅞	7	Nil
	Argentine Transandine ..	111	—	—	—	—	—	—	—	A. Deb.	52	45	40	10
	Bolivar	174	Apl., 1935	6,750	+ 350	17	26,300	27.050	— 750	6 p.c. Deb.	10	6½	10	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	13¾	10 7/16	13	3 15/16
	Buenos Ayres & Pacific ..	2,806	18.5.35	100,354	+ 11,656	46	3,639,581	3,944.559	— 304,978	Ord. Stk.	16⅝	8½	7½	Nil
	Buenos Ayres Central ..	190	5.5.35	$103,300	+ $3,500	44	$4,820,000	$4,673,800	+ $146,200	Mt. Deb.	23	10	21½	Nil
	Buenos Ayres Gt. Southern	5,085	18.5.35	133,884	— 826	46	6,647,414	7,229,440	— 582,026	Ord. Stk.	35	22	23	Nil
	Buenos Ayres Western ..	1,930	18.5.35	56,080	+ 10,067	46	2,089,280	2,442 698	— 353,418	,,	27½	18½	18	Nil
	Central Argentine	3,700	18.5.35	144,646	+ 8,665	46	5,575,937	6,038,338	— 462,401	,,	23	13½	15	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	14	7	7	Nil
	Cent. Uruguay of M. Video	273	18.5.35	9,755	— 5,501	46	628,136	754,969	— 126,833	Ord. Stk.	15½	8	5½	Nil
	Do. Eastern Extn.	311	18.5.35	2,361	— 1,002	46	89,208	156,597	— 67,389	—	—	—	—	—
	Do. Northern Extn.	185	18.5.35	1,158	— 1.150	46	51,214	87,584	— 36,370	—	—	—	—	—
	Do. Western Extn.	211	18.5.35	496	— 639	46	34,623	71,585	— 36,962	—	—	—	—	—
	Cordoba Central	1,218	18.5.35	27,690	— 1,230	46	1,289,640	1,502,430	— 212,790	Ord. Inc.	6	3	2½	Nil
	Costa Rica	188	Mar., 1935	18,257	— 2,479	39	149,326	178,636	— 29,310	Stk.	30¾	23½	32	6¼
	Dorada	70	Apl., 1935	10,700	+ 1,100	17	44,100	41,100	+ 3.000	1 Mt. Db.	103	95	104½	5¾
	Entre Rios	810	18.5.35	11,293	+ 645	46	559,896	558,293	+ 1,603	Ord. Stk.	21½	12	12½	Nil
	Great Western of Brazil ..	1,082	18.5.35	6,100	+ 100	20	180,500	173,400	+ 7,100	Ord. Sh.	⅞	5/8	½	Nil
	International of Cl. Amer.	794	Mar., 1935	$469,057	— $83,653	13	$1,307,612	$1,523,084	— $215,742	—	—	—	—	—
	Interoceanic of Mexico ..	—	—	—	—	—	—	—	—	1st Pref.	1/-	1/-	½	Nil
	La Guaira & Caracas ..	22⅝	Apl., 1935	4,960	+ 1,490	17	15,500	14,380	+ 1,120	Stk.	12⅝	7⅝	8½	Nil
	Leopoldina	1,918	18.5.35	18.201	+ 850	20	444,032	431,331	+ 12,701	Ord. Stk.	14⅝	7	5½	Nil
	Mexican	483	14.5.35	$246,000	— $3,700	19	$4,616,700	$4,445,400	+ $171,300	,,	3¼	1½	1½	Nil
	Midland of Uruguay ..	319	Apl., 1935	6,362	— 1,230	43	97,748	95,108	+ 2,640	,,	1½	½	1½	Nil
	Nitrate	401	15.5.35	5,439	— 267	19	55,133	64,521	— 9,388	Ord. Sh.	32 9/32	51/-	2¼	Nil
	Paraguay Central	274	11.5.35	$1,703,000	+ $626,000	45	$51,287,000	$32.772,000	+ $18,515,000	Pr. Li. Stk.	84	67	60½	9 15/16
	Peruvian Corporation ..	1,059	Apl., 1935	68,305	+ 18,338	43	625,461	556,896	+ 68,565	Pref.	14½	8	7½	Nil
	Salvador	100	11.5.35	¢17,400	— ¢5.100	45	¢953,252	¢965,883	— ¢12,631	Pr. Li. Db.	75	70	65	7 11/16
	San Paulo	153½	12.5.35	23,537	— 4,468	19	473,190	528,006	— 54,816	Ord. Stk.	86	67	58	4 5/16
	Taltal	164	Apl., 1935	4,500	+ 2,875	43	31,385	24,072	+ 7,313	Ord. Sh.	2⅛	1 7/16	1½	6 11/16
	United of Havana	1,365	18.5.35	22,786	+ 3,792	46	1,078,690	892,290	+ 186,400	Ord. Stk.	6	2	2½	Nil
	Uruguay Northern	73	Apl., 1935	891	— 70	43	10,726	11,507	— 781	Deb. Stk.	6¼	3	4½	Nil
Canada.	Canadian National	23,735	14.5.35	661,383	— 22,656	19	11,739,895	11,504,914	+ 234,980	—	—	—	—	—
	Canadian Northern ..	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	78¼	51½	59½	6⅝
	Grand Trunk	—	—	—	—	—	—	—	— 4 p.c. Gar.		104½	97¼	101½	3 15/16
	Canadian Pacific	17,211	14.5.35	452,600	— 58,200	19	8,168,200	8,310,000	— 141,800	Ord. Stk.	18 5/16	11 1/16	11½	Nil
India.†	Assam Bengal	1,329	30.4.35	34,957	— 2,994	4	98,025	123,631	— 25,606	Ord. Stk.	88½	72	83½	3 9/16
	Barsi Light	202	30.4.35	3,450	— 870	4	12,052	12,967	— 915	Ord. Sh.	10 4½	9 8⅝	35 1/2	5⅝
	Bengal & North Western ..	2,113	30.4.35	76,636	— 2,095	4	221,979	237,890	— 15,911	Ord. Stk.	29 7½	26 2	29 6½	5⅝
	Bengal Dooars & Extension	161	20.4.35	1,970	— 203	3	6,307	6,269	+ 38	,,	12 5¼	12 4	12 4½	5⅝
	Bengal-Nagpur	3,269	10.4.35	173,700	+ 8,651	2	173,700	165,049	+ 8,651	,,	10 5½	9 6	10 1½	3 15/16
	Bombay, Baroda & Cl. India	3,072	10.5.35	253,050	+ 2,175	5	957,750	952,950	+ 4,800	,,	11 5	10 8½	11 4½	5¼
	Madras & South'n Mahratta	3,230	20.4.35	154,875	— 21,356	3	297.225	348,377	— 51,152	,,	13 1	12 2¾	12 5½	7 9/16
	Rohilkund & Kumaon ..	572	30.4.35	15,458	— 1.391	4	49,770	54,205	— 4,435	,,	26 3	25 0	29 0½	5½
	South India	2,526	20.4.35	114,802	— 889	3	224,371	227,299	— 2.928	,,	11 9	11 5	11 7½	6 15/16
Various.	Beira-Umtali	204	Mar., 1935	73,647	+ 24,140	26	378,782	290,974	+ 87,808	—	—	—	—	—
	Bilbao River & Cantabrian	15	Apl., 1935	1,022	— 765	17	7,150	7,749	— 599	—	—	—	—	—
	Egyptian Delta	621	30.4.35	5,070	+ 134	4	16,103	15,611	+ 492	Prf. Sh.	2 15/16	1¾	1⅞	5⅝
	Great Southern of Spain ..	104	11.5.35	1,975	— 303	19	36.037	41,655	— 5,618	Inc. Deb.	4	3½	3½	Nil
	Kenya & Uganda	1,625	Apr., 1935	222,462	+ 6,476	17	924,843	859,480	+ 65,363	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	50	33	44½	7⅞
	Mashonaland	913	Mar., 1935	118,527	+ 29,656	26	687,786	530,604	+ 157,182	1 Mg. Db.	101	91¾	102½	4⅞
	Midland of W. Australia ..	277	Mar., 1935	12,005	— 1,495	39	122,226	122,214	+ 12	Inc. Deb.	100	93	96½	5 5/16
	Nigerian	1,905	6.4.35	31,521	+ 1,185	1	31,521	30,336	+ 1,185	—	—	—	—	—
	Rhodesia	1,538	Mar., 1935	206,064	+ 52,199	26	1,137,061	908,456	+ 228,605	4 p .. Db.	104⅞	97½	103½	3⅞
	South African	13,217	27.4.35	474,548	— 17,522	4	2.098,201	1,882,858	+ 215,343	—	—	—	—	—
	Victorian	6,172	Jan., 1935	834,638	— 17.346	30	5,586,612	5,388,619	+ 197,993	—	—	—	—	—
	Zafra & Huel	112	Mar., 1935	11,058	— 362	13	32,962	34,675	— 1,713	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. Salvador and Paraguay Central receipts are in currency

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the sterling weekly receipts at the par rate of exchange as proved misleading, the amount being overestimated. The stateme from July 1 onwards are based on the current rate of exchange and not on the par value